RAILROAD GAZETTE

SATURDAY, SEPTEMBER 4, 1875.

Contributions.

Iron and Steel for Fire-boxes.

TO THE EDITOR OF THE RAILROAD GAZETTE:

On reading the report of the Committee of the Master Mechanics' Association on the best material, construction and operation of boilers, presented at the last meeting, and the discussion that followed, it occurred to me that I could help come to a conclusion, or at least add a few facts to such as have already been considered. This question was well presented, and a conclusion almost arrived at in the following from the report:

"From the information received and their own experience the Committee believe that good homogeneous steel that will not harden is the best material for boilers and fire-boxes. * *

"The objections to iron fire-boxes are the difficulty of getting iron that will not blister, and its tendency to burn out and become brittle. * * *

"With steel the main objection urged is its cracking."

The word steel, as at present used, applies to a great many kinds or varieties. Mr. Coleman Sellers has, in the discussion, limited steel to three types; this he may have applied to cast steel. He says the earliest form is that made in crucibles. Blister steel is a type of steel which may have a bearing upon the question at issue. It is produced by packing wrought iron in powdered charcoal, in an air-tight box, and submitting the whole mass to a high heat for several days.

Case-hardening iron is one and the same thing, as far as it goes. I hope to make it evident why I refer to blister steel and case-hardened iron; in both cases, the iron that was once, or at first, too soft and tough, has been rendered hard and brittle, as has been the case with some of the fire-box plates. Steel is an alloy of iron and carbon; this alloy is generally produced by the aid of heat, and in such proportions of carbon or hardness as the maker may desire when he has it under control, but when not under control its quality is very uncertain.

For a more particular explanation, see Muspratt's *Chemistry*, vol. 2, page 441, or any other good work on iron and steel.

Mr. Sellers also tells us that "he has heard but little said about the quality of the steel used." "Steel differs very much in quality." This is the case, but that depends upon the purity of the iron the steel is made from. The more impurities there are in the iron the more brittle and fractious the steel. This would have a bearing on our investigation, but perhaps not enough to consider it at this time.

The committee's report says:

"The Committee believe the greatest trouble with steel is that the metal as manufactured is not uniform. Manufacturers of steel should take this matter in hand, and also consider the fact that it is probable, in the opinion of the Committee, that some chemical action, as yet imperfectly understood, takes place between the gases of combustion and the steel-plates of the fire-box."

Steel may be considered to be a chemical production. Its behavior and the changes produced in the fire-box plates are great when subjected to heat, and the supposed chemical changes take place.

If the steel was always immersed in water, no matter how hot the water may be (if no fire comes in contact with the plates), I doubt if there would be any chemical or mechanical change in its condition. Every time the steel plate is heated and cooled, no matter how quick or slow, it undergoes a change, and, strictly speaking, it will not be exactly what it was before. Subject the plates to an intense heat and they at once become unserviceable, and without reworking they may become useless.

Many years ago I had the ordering of the stock and material for an extensive locomotive shops. At one time we gave an order for a large lot of Low Moor tires for locomotive driving wheels; some of them came too large in diameter. I mentioned this to the selling agent; said he, "Why don't you shrink them?" "How do you do it?" He said: "Dig a hole in the ground large enough and deep enough to put the tire into; fill this hole with water, heat the hoop quite hot and drop it into the water." This we did, and the hoop shrunk about 1-16 of an inch in diameter without doing anything else to it. I have no doubt this can be done to steel.

"Shrinking is simply heating the steel and plunging it in cold water, but should it not prove small enough the first time the operation must be repeated, and if insufficient the second time it must be operated upon the third time, which generally effects the purpose." *

The evidence brought forward during the discussion is probably conclusive that steel can be shrunk repeatedly and almost indefinitely. This can only be done when the plates are hot and cooled. To crack the fire-box plates they must be affected in this way.

It is a well-known fact among those who are in the habit of hardening steel that the hardening increases its dimensions.†

The amount of expansion cannot be exactly stated, for it varies in different kinds of steel and in the same steel operated upon at different heats. But this expansion can be prevented in a great measure by annealing the steel about three times before the article is finished.

I have found that articles treated in this way will always keep their size better in hardening than if the steel was only annealed once.

This repeated annealing may have an influence on the fire-box plates, and account in part for the varied behavior of the steel plates.

* See page 38 of a small book on the management of steel and case-hardening of iron, by George Ede.

The annealing should have perhaps been done more than once, or more thoroughly. This may in a measure reduce the expansion and contraction in the fire-box plate, but this would not remedy the whole trouble.

But it sometimes happens that a piece of steel is wanted in a hurry, and the steel, perhaps, is too hard to work on and cannot wait for its being softened in a box; in such cases it may be heated in an open fire, and buried in charcoal dust till it is cool; or if it be heated to a red heat sufficient to be seen in a dark place and then plunged into cold water it will work more pleasantly, but not be so soft as if it were heated in a box with charcoal.†

This was practiced in the shop when I was an apprentice, and the process was then called water annealing.

Tensile strength of fire-box plates is not to be considered, as it is of but little account. Iron, so far as this is concerned, is as good as steel; but for the shell it is all important, and this will probably be fully understood.

Thirty years ago locomotive boiler fire-boxes were made 40, 44, and 46 inches long—that is, the side plates were of that width, and generally of Low Moor iron; the water space between the inside and outside plates 2¼ inches, stay-bolts about 4½ inches apart; wood for fuel. There was then seldom any complaint about the fire-box plates when the water space was kept clear of mud or deposit of any kind.

How these plates in short fire-boxes stand with coal as fuel, as now used, I do not know, but I will venture to say pretty well. I am informed that the side plates of the fire-boxes are now made 60, 70, 80, and in some instances 86 inches long, and as deep as the short fire-boxes. Water spaces as recommended by the Committee are three inches. Three and a half is better. This is increasing the length of the water spaces, while it does not increase the width in proportion, and the stay-bolts are as much if not more of an obstruction than with the old or short fire-boxes. With the intensely hot coal fire on one side of the steel plate, with an obstructed or reduced circulation, or no circulation of water on the other side, what is to prevent the plates from becoming over-heated, the same as the crown-plate of the fire-box will when the water is low, or when the crown is partially or entirely uncovered, and at times very hot? At such times the plates may absorb or take in carbon, and in the absence of oxygen the iron plates, if iron is used, be partially corroded, or changed to blister steel. If steel plates are used they may add carbon to that already in the plates.

The fire at times, as well as the water, is beyond control, and the plates must take their chances of becoming partially or totally destroyed. Knowing how readily some kinds of iron will absorb or alloy itself with carbon, it is not to be wondered at that the fire-box plates are at times of high temper and brittle, thus producing or making a converting furnace within the fire-box, similar to that of the steel converting furnaces as referred to in the first part of this letter.

More water space is needed around the fire-box plates, and that in proportion to the length and depth of the furnace, or a better water circulation. Carry more water over the crown sheets (say not less than six inches in depth) when the plates fail there or crack. Use iron instead of steel plates. In case iron or steel plates are used, let it be as near as possible pure iron, or pure iron and carbon, and as little carbon in the iron or steel as possible.

S. F. GATES.

TAUNTON, Mass., June 22, 1875.

† See pages 34 and following of the book above referred to.

The Centennial Grounds Railroad and the Exhibition of Rolling Stock on it.

PHILADELPHIA, Aug. 30, 1875.

TO THE EDITOR OF THE RAILROAD GAZETTE.

The West End Passenger Railway Company, of this city, have entered into a contract with the Centennial Board of Finance of the United States Centennial Commission, by which they have secured the *exclusive right* to construct and operate a double-track passenger railway *within the Exhibition grounds*, during the great Centennial Exhibition of 1876. These grounds are almost inclosed with a neat fence, ten feet high. The railway will traverse the entire circle from building to building, a distance of about three and one-half miles, making seven miles of single track, to enable us to run cars in both directions, providing rapid transit by steam power, and convey passengers promptly and with comfort to all parts of the Exhibition grounds, which embrace 500 acres.

The equipment will be composed of several handsome engines and a full complement of palace cars, many of which have already been tendered the company *free of cost* by various locomotive and car builders of the country. These engines and cars will comprise the most complete and perfect trains in the world, as they are built by the various manufacturers purposely for competition and exhibition.

The carriage concourse is placed outside the enclosure, and all vehicles, from the very nature of the arrangement of the grounds and walks, must of necessity be entirely excluded from the Centennial grounds. Hence this railway will be the *only means of transportation within the enclosure*, and afford the manufacturers of cars and engines a much better method of exhibiting them than by placing them in the buildings, where they would remain stationary.

Upon the tracks of this company they will be shown *in motion* to thousands of visitors daily, and an excellent opportunity given to display the workings of the engines, patent air and vacuum brakes, journal-boxes, and the workmanship, style and finish of the different builders.

This line is to be completed by November 1, 1875.

R. W. FLOWER, JR., President.

Steel in Engineering Practice.

During the session of the American Railway Master Mechanics' Association, in New York, last May, some experiments were tried to show the comparative strength of cast-steel and wrought-iron car axles. The experiments appear to have been conducted under the supervision of a committee appointed by the Association, the steel axles having been furnished by the Midvale Steel Works of this city, and the iron axles selected by two members of the Association who desired the test, one lot of iron axles having been forged expressly for the test, at the shops of the gentleman furnishing them, the other lot having been selected by the other gentleman from the axles used successfully on the road under his charge. A full account of these experiments appeared in the June number of the *American Artisan* of New York, one of the editors of that paper having been present during the test, and an abstract of the report of the Committee was published in the *Railroad Gazette* of New York. These accounts have been pretty generally copied into other journals, and the experiments have been mostly received as useful and corroborative of the commonly conceived idea of the superior strength of steel. These experiments consisted in letting fall a drop weight of 1,600 lbs. from heights of 25 and 35 feet upon the bars of iron and steel which rested on rigid supports placed 3 feet apart, the blow being delivered midway between the supports. While some iron axles stood three or broke at the fourth blow, others broke at the second blow, all of 25 feet fall, and the only steel axle that was broken at all had three blows of 25 feet and then eight blows from the height of 35 feet.

It may be well to state that the experiments tried in New York were merely a repetition or an exposition of the test adopted by railroads using steel rails in determining the fitness of the steel for railroad purposes. On the reasonable assumption that car axles are submitted to strains requiring stiffness and strength, the test of dropping a weight upon the axle and noting the deflection seems one that would naturally be resorted to. It has, therefore, come to be common practice in ordering steel axles that for one hundred axles ordered, a certain number agreed upon in addition shall be furnished—that this additional number, selected at random from the pile, shall be subjected to the following test: they are placed one at a time upon rigid supports, 3 feet apart; upon the center of the axle, midway between the supports, a drop weight of 1,500 lbs., raised 25 feet, is allowed to fall that distance. The amount of bending caused by the blow is noted. The axle is turned over and another blow from the same height is given, which straightens the axle more or less; so, turning the axle between each blow, five blows are given. If all the test-axles stand these blows, the whole lot is accepted; if any of them break, they are all rejected. It is usual to continue the test by blows of 1,500 lbs., drop falling 40 feet, until the axles are broken, but all blows after the first five are not considered in the test, so far as the acceptance of the axle is concerned. The trial of the sample axles is supposed to show two things: great strength to resist strains or shocks, and in relation to the amount of bending, the hardness or stiffness of the material. We have seen steel axles break on the second blow, and we have seen them so tough as to require many 40 feet blows to break them. We cannot but think the test the best one possible, under the circumstances.

It has been our intention to comment on these experiments, but we delayed doing so to obtain some definite information from prominent railroads as to the success of the steel axles in actual use. While engaged in this inquiry, we are met by an article in one of our exchanges, a widely circulated paper, devoted to the iron interest. The article is headed "Steel Railway Axles." After commenting on the nature of the test, the writer says: "If tests made by means of weights subjected an axle to strains in any respect similar to those it encounters in actual service, the results might be considered as conclusive; but they do not; consequently, they are practically valueless as determining whether steel is, or is not, a better material than iron for this use." Again: "It (steel) has from time to time been tried on railroads, and each time abandoned." Then the writer gives his conceptions of the reasons for this, and further on says: "Steel axles have been placed under cars on several different railroads, by gentlemen with whom we are acquainted, and in each case they were abandoned on account of their liability to heat. We know this as a fact, although we do not know the reason for it." These few sentences suggest a treatment of the subject not originally intended. That steel car axles should have been tried and then abandoned, is not surprising, as the cost of steel is even now very much greater than the cost of iron. But that their use should have been abandoned on account of steel being more liable to heat, is a matter of great surprise, and worthy of careful consideration. An inquiry of the leading engineers other than railroad engineers fails to elicit any experience that would seem to confirm this statement. All that we have heard about steel being liable to heat comes to us in statements somewhat like the article above referred to. That is to say, a mere assertion without any explanations of the conditions under which the trial has been made.

We are told by the writer before alluded to, that a certain size of journal is needed for purposes of lubrication, and that the Master Car Builders' standard axle has journals 3¼ inches diameter, while 3¼ inches journals are carrying the load with probably a large margin of strength, but with too little surface for lubrication. Friction being independent of surface within certain limits, the 3¼ inches journal in iron, if 5 inches long, may heat; if 6 or 7 inches long, may, with its lateral increase of surface, bear the load with safety from heating, and no more frictional resistance, because the diameter, and consequently the surface velocity, has not been increased. Does it not seem reasonable, that with some stronger and stiffer material than iron, the journal may be made to present to its brass box the amount of surface needed to prevent abrasion in a less diameter and a greater length?

There really seems no reason why the practice of the railroads should differ materially from the practice of the workshop. Car axles revolve under conditions not much worse than the journals and shafts in any machines, and what applies to one applies as much to the other. Any journal, if submitted to too much pressure, will heat. When it does heat from causes other than want of proper lubrication, it is necessary to diminish the load, to diminish velocity or to extend the surface under pressure, and in the case of a journal, all the things being equal, this extension can best be made useful by extension in length, not in diameter. In an over-hanging journal, as the outside bearing of car axles, an enlargement of diameter increases velocity of the rubbing surfaces, and so increases the frictional resistance inasmuch as the same frictional resistance is acting at a greater distance from the center. An increase of length, the diameter remaining the same, will diminish the wear without increasing the frictional resistance, inasmuch as the pressure per square inch of surface will be less. When the limit of extension has been reached in such journals on iron shafts of a given strength, no engineer would hesitate to make them still longer if a stronger and stiffer material can be substituted for the iron.

At the same session of the Master Mechanics' Convention at which the steel axles were tested, the form of iron axle recommended by the Master Car Builders, with a journal 3¼ inches diameter, 7 inches long, was not adopted on account of its being larger and heavier than axles doing good service, and in the minds of some who voted, on account of the probable introduction of *steel* axles of a much smaller size than could with safety be made of iron. While some roads, as we are told, have tried and abandoned steel car axles, we know that others have used them, and are using them successfully after a continuous experience of many years.

We have made inquiry of one railroad using steel axles extensively, and found that it alone has nearly twenty-six

thousand steel axles in use under its passenger and some freight cars.

It may be asked why roads so using them do not take advantage of the extra strength and stiffness, and reduce the size of the axle, to diminish the dead weight, to diminish the cost, and to diminish the frictional resistance?

We hope soon to be able to present to the readers of the *Journal* a statement of the experience of this railroad, now using 26,000 axles, when it will be seen that that road does use as long a journal, and one of smaller size than that recommended by the Master Car-Builders' Association, and use it to advantage, made of steel.

That other railroads using steel axles should not at once avail themselves of this advantage of steel is clear enough to those familiar with the management of roads. Changes in such matters as size of axles involve great changes in many other portions of the cars. Such changes cannot be made at once; a wise policy retains existing sizes, but insures security to passengers by the use of the stronger material in the equipment of passenger cars, and then slowly and surely makes any changes that may seem warranted by experience, not of one year, or two years, but of many years, and as indicated by the clear record of all that experience.

Inasmuch as the steel interests of this country are now so rapidly increasing, we deem an inquiry into its possible displacement of iron in engineering practice of great importance.

We have been informed that steel is entering more and more largely into the construction of locomotives abroad, and if we mistake not, the engines made for a Russian railway last year by the Grant Locomotive Works, of Paterson, N. J., had all parts that could be, made of steel. The rapid advance of the steel manufacture in this country, and the cheapening of the material by improved methods of manufacture, demand a careful consideration of its merits in machine construction.

Steel is now procurable of different qualities, suited to different uses to which it may be applied, and we think the time is near at hand when these qualities will be so well defined as to render their selection by the engineer an easy matter. All the so-called steels, from the finest tool steel down to the qualities which contain so little carbon as to prevent them from showing any hardening properties when heated and cooled suddenly, seem to have physical properties which readily distinguish them from what we know as bar or wrought iron. The process of manufacture of the low grades of steel is so distinct from the mode of making the wrought iron of commerce that the so-called steel, containing the least possible amount of carbon, differs materially from the so-called wrought iron which has been proved to contain the greatest amount of carbon. This difference is marked in regard to strength and stiffness. Steel of all grades, from the softest up to the hardest, behaves differently in the lathe from wrought iron, presenting a more uniform surface when turned or planed, and seldom showing any sign of seam or fiber, as is evidenced in wrought iron.

This finer surface, the greater strength, the greater stiffness, seem to indicate it as *par excellence* the material for machine construction. On railroads steel rails are taking the place of iron, steel tires are encircling the driving-wheels, steel sheets form the boilers, and steel connecting-rods of light model are in some cases taking the place of the more cumbersome iron ones; but yet we are told that steel car axles are more liable to heat than iron ones.

We have heard the same statement made of steel crank-pins; we have, therefore, included them in our inquiries of railroads using them, and we look for the report now being prepared for us with interest. In machine shop practice we found examples of steel crank-shafts succeeding where iron shafts failed.

As an illustration of this deplacement of iron by steel, in engineering practice, mention may be made of the experience of a firm in this city. Some small engines were being constructed, intended to be run at high speed, 900 revolutions per minute. They were fitted with wrought-iron crank-shafts, carefully fitted to run in phosphorbronze bearings. In the first trial of one of these engines, the shaft cut so badly as to stop the engine long before the proper speed had been obtained. The shaft was taken out, smoothed up, and the bearing carefully lapped out, to give more room for oil, and, under an unusual lubrication, it again cut. A case-hardened iron shaft was tried with slightly different results. Steel was then used, and the same size steel shaft ran without cutting, and showed, after long use, no unusual wear. The steel used was that known as machinery steel, and was adopted in place of iron only on account of its being stiffer. A careful examination of the conditions under which the soft iron and the case-hardened iron gave out clearly indicated that the shaft bent in the journal under the pressure of the work on the crank.

In machine shop practice, iron shafts are used on account of their cheapness, wherever practicable; but when it is deemed advisable not to increase the diameter, on account of the velocity, or for other reasons, steel is always resorted to as permitting greater strains, so that in considering the proportions of machines, it is common usage, in case of doubt as to strength of shafts, to substitute steel for iron.—"S." in the *Journal of the Franklin Institute.*

The Probable Life of Iron Structures.

[Abridgment of a paper on the Probable Life of Iron Structures, read in Berlin before the general convention of the Union of German Societies of Engineers and Architects, in September, 1874, by Dr. Hermann Fritzsche, Royal Chief Engineer in Dresden.]

The question of the probable life of iron structures had been enumerated by the convention in 1873 of delegates at Eisenach among those deserving a discussion during the present general convention, and I have been appointed to collect data and to report on the question.

Several of our engineers, who have made the subject of iron structures their specialty, have been invited to prepare papers, but none were received. Thus I am compelled to give only an introduction to the discussion of this question as far as my own experience allows me to furnish one.

The life of iron structures, supposing that the strains of the material are fixed upon in a scientific manner, will depend:

1. *On the life of the material itself*, as forged, rolled or cast bridge members.

2. *On the life of the connections* of several parts, as rivets or bolts on several connections.

With reference to *the durability of the material* itself, if used in the form of homogeneous bars, beams, plates, tubes, etc., many very thorough tests have been made, and inquiry has been made as to what may be the influence of millions of repetitions of flexures, of torsions, blows of hammers or of heavy impacts and of vibrations. Under these experiments nothing was discovered that could cause fear as to the use of iron in bridges or in buildings, and it thus only remained to direct the attention of engineers and architects towards the protection of iron structures against rust. This protection is found in properly draining off water, in calking and puttying the seams, and in the proper maintenance of the painting. Of course it must always be supposed that the dimensions of the chords, ties, ribs, columns, etc., have been chosen so as *to answer their respective strains.*

In this respect I direct your attention to a pamphlet on the determination of the greatest allowable strains in iron structures, a copy of which Director Gerber,* of Munich, has had the kindness to send me. This pamphlet is based upon the very exact experiments of Mr. Woehler, of Berlin, in which the following results are explained in detail:

1. By every single strain in an elastic bar a change of the arrangements of its atoms is caused, and this change depends on the value of that strain.

2. These changes, after a sufficient number of various strains (oscillations) in addition to the molecular displacements due to a permanent strain (from dead load) finally cause rupture of the bar. The sum of the constant plus the changeable strains is *less* than the strain which, under a dead load alone, would cause rupture, and which is called the ultimate strength.

3. The value of the changeable strain (due to the live load) can be raised to a certain limit, which is so low that a very great number of single impacts by live load (oscillations) would be necessary to cause rupture.

The relation of varying permanent strains can be represented by an equation. This equation more especially expresses that, if the varying strains are taking place in opposite directions, the admissible strain per square inch of the iron becomes *considerably less* than the difference of the permanent strain and the above mentioned limit. Therefore the design of structures in which the members are alternately under tension and under pressure† requires special attention.

4. The additional effect of impacts, caused by cars and wagons on railroad and street bridges, amounts to not more than 10 per cent.,‡ while the strains caused by moving columns of men keeping step are to be counted equal to an effect 1⅓ times the variable load.

5. Supposing the greatest possible live load, and putting its effect equal to a dead load one and one-half times as great, the majority of executed structures on the average are strained to 23,000 lbs. per square inch.§

6. Of the horizontal forces acting on bridge frames, the *action of wind* is the *greatest*, and it is perfectly safe to suppose a pressure of 31 lbs. on each square foot (150 kilos. per square metre) of a *fully loaded bridge*, while examination must be made as to whether an *unloaded* bridge is still in stable equilibrium under a pressure of 58 lbs. per square foot of surface.

[The pressure of 31 lbs. per square foot is strong enough to overthrow empty railroad cars, and it corresponds with a velocity of the wind equal to 78 miles per hour, while the pressure of 58 lbs. is caused by a wind making 106 miles in an hour.]

Professor Launhardt, of Hanover, has sent me a copy of his paper read in the year 1873 before the Society of Architects and Engineers of Hanover. In this paper—also based upon Woehler's experiments—he has given a very simple formula for the calculation of the strength of parts of structures, and he has proved that a waste of material is involved if one and the same strain per square inch is specified for the whole structure.

In regard to *the durability of the connections* in iron structures, such as rivets, bolts, screws, etc., similar investigations to those made for the material itself, according to my knowledge, have not been carried out, and I therefore recommend strongly this subject to the attention of the profession.

The influence of changes of temperature in this respect stands foremost, especially if these changes take place differently in different parts of the same structure.

It is asserted that bridge trusses by degrees become more and more *magnetic*, that strong magnetic action precedes rupture, and that therefore examinations as to the increase of magnetism should be made in order not to be surprised by accident. This assertion may only be an hypothesis, but in all cases engineers find themselves in uncertainty so long as we have not thoroughly examined the durability or life of our iron structures.

A number of years ago, when duty called me to the preservation of iron railroad bridges, I quite felt the deficiency of our knowledge with reference to the question "whether and at what place a bridge truss would require repairs?" Of course it cannot be expected that merely the preservation of the surface against rust by repainting or the replacement of single loose rivets is sufficient to preserve iron structures. In the year 1858, on occasion of a journey of inquiry through England, I had learned that the celebrated Britannia bridge on the Chester & Holyhead Railroad, built only eight years previous by Stephenson, required repairs almost without interruption. These repairs consisted of exchanging *worn out parts, especially the rivets.* From this time I began to feel strongly a certain distrust of iron structures, especially for very large spans.

Accordingly, the question seemed justified: How must we examine iron structures in order to obtain a proper idea as to their durability?

Airy, of London, by observation of the sound, has measured the tensions and pressures of the diagonals and posts of a model of a bow-string girder, but of late nothing more on this subject has been heard from him. His experiments seem to be too complicated to become useful for practice. Chief Engineer Basler's experiments in Ludwigshafen perhaps have been more successful. He has found that tension bars of riveted bridge structures give different sounds, showing that they were originally under different strains. My own practice in the maintenance of wooden bridges has been, that the deflections under passing trains increase from year to year over those measured when the wood was still new. This experience led me to suspect similar results for iron structures, and to suggest that for a greater number of years experiments on deflections of a sufficient number of larger iron structures should be made, of course always under the same circumstances, so as to find out whether a gradual loosening of rivets, bolts, screws, rollers, etc., will take place, and whether consequently greater deflections will follow.

In the year 1872, following the lead taken by the Altona & Kiel Railroad, I suggested that the bridges of the Royal Saxon State roads should be examined every two years, whereupon the satisfaction was given to me that tests for all iron bridges were ordered to take place after the lapse of each five years. The measurements of deflections which have been recorded since that time have established that all of the tested structures were still in satisfactory condition, but it is not possible to derive therefrom a conclusion whether the stability of these bridges has diminished since their time of erection, as the tests before their acceptance were not sufficiently recorded.

Dr. Hermann Fritzsche thereupon proposed to measure regularly the deflections of bridges.

After a longer and detailed discussion of this question, the following more general resolution was unanimously accepted:

"That the Union of German Societies of Architects and Engineers should urge the general introduction of regularly repeated observations of the behavior of iron structures, according to a systematic plan, and that this plan for the collection of data and results should be published."

* Mr. Gerber is an experienced bridge engineer, having been connected for a long time with the Kramer & Klett Co., in Nuremberg. In this capacity he has developed the Pauly girder, the largest of which ever built by him is the bridge at Mains. Mr. Gerber is also the inventor of continuous truss bridges with hinges.

† Referring to continuous girders, to stiffened suspension bridges, to swing bridges, and also to arch bridges.

‡ Experiments made in France (published in the *Annales des Ponts et Chaussees*) proved deflections of *bridge trusses* under rapidly passing trains to be 10 per cent. greater than under the dead load. The effect on the floor system, however, is certainly more important.

§ Mr. Gerber in his first designs used to determine the sections of the metal in his numerous bridges so that the sum of the strains from dead loads, plus three times the strain from live loads, amounted to 23,000 lbs. per square inch.

ANNUAL REPORTS.

Mexican Railway.

From the report of the Directors submitted at the twentieth ordinary general meeting of the company, held in London on the 30th of June, we extract the following:

Length of line opened for traffic: Vera Cruz to the City of Mexico, 263¼ miles; Branch to Puebla, 29¼; total, 292½ miles. Gauge 4 ft. 8½ in.

Gross earnings ($8,026 per mile)	$2,347,575
Working expenses (52.18 per cent.)	1,225,131
Net earnings ($4,188 per mile)	$1,122,444
Earnings per train-mile	$4.04
Expense per train-mile	2.10

For the year the weekly earnings per mile were $154 against $143 in 1874, showing an increase of 8 per cent. For the first four months of 1875 the earnings have been about $168 per mile per week which is an increase of 9 per cent. over the average of 1874 and of 17½ per cent. over the average of 1873.

A subvention of $660,082 was received from the Mexican Government during the year, making the total net income of the year $1,782,526, or $6,128 per mile of road—enough to pay 7 per cent. on the cost, $87,500 per mile.

Texas & Pacific.

At the close of the last fiscal year, May 31, 1875, this company worked the following lines:

	Miles.
Shreveport, La., west to Eagle Ford, Tex.	193.29
Marshall, Tex., north by east to Texarkana	74.23
Sherman, Tex., east to Brookston	56.18
Total	323.70

During the year eight miles, from Dallas to Eagle Ford, were constructed. Of the first-named line, 16.17 miles, from Shreveport to the Texas State line, were built under the charter of the Vicksburg, Shreveport & Texas road and are worked under a lease. About 49 miles more, from the Texas line to Longview, were built by the old Southern Pacific Company and were bought from that company; the other lines were built by the present company. There are 96 miles, from Brookston to Texarkana, and 24 miles, from Eagle Ford west to Fort Worth, which are graded, tied and bridged, and a section of 10 miles eastward from San Diego, Cal., is also graded and bridged.

The equipment consists of 29 locomotives, of which two are in use as stationary engines in shops and two are not in use, being of 5 feet 6 inches gauge; 5 first and 10 second-class passenger, 3 combination and 7 baggage, mail and express cars; 113 box, 67 stock, 226 flat and 11 caboose cars; 1 directors', 3 boarding, 1 wrecking and 1 pile-driver car.

The work done during the year was as follows:

Train mileage	826,406
Passengers carried	129,035
Passenger mileage	7,458,450
Tons freight carried	737,197
Tonnage mileage	14,026,174

Of the passenger mileage 57.7 per cent., and of the tonnage mileage 66.6 per cent., was of west-bound traffic. Local business furnished 56.7 per cent. of the passenger and 39.4 per cent. of the tonnage mileage. The cost of engine service was 24.5 cents per mile. The number of bales of cotton carried was 102,414, of which 32,992 went to the St. Louis, Iron Mountain & Southern road at Texarkana, 28,276 to the Houston & Texas Central at Sherman and Dallas, 11,731 to the International & Great Northern at Longview and Mineola, and 10,199 to the Red River boats at Shreveport. The remaining 19,216 bales was local cotton not consigned to any point beyond the road, the largest amount going to any one point being 16,415 bales to Shreveport.

The earnings for the year were as follows:

From passengers (27.62 per cent. of total)	$326,832 62
Freight (61.68 per cent.)	729,866 23
Express, mail, telegraph, etc. (4.15 per cent.)	49,014 44
Rental (6.55 per cent.)	77,600 04
Total receipts ($3,695 per mile)	$1,183,313 33

The expenses were:

Conducting transportation (29.8 per cent. of total)	235,657 02
Motive power (26.1 per cent.)	205,454 00
Maintenance of way (28.5 per cent.)	224,956 20
Maintenance of cars (10.1 per cent.)	80,373 11
General expenses (5.5 per cent.)	43,363 62
Total expenses (66.70 per cent.)	$789,803 85
Net earnings ($1,229 per mile)	$393,509 48

From these net earnings, however, there are the following items to be deducted:

Interest and exchange	$21,362 62
Legal expenses	15,217 27
General office expenses	20,733 16
County taxes	5,088 71
Total	$62,401 76

These reduce the net earnings to $331,107.72, and increase the proportion of expenses to earnings to 72.02 per cent.

The average earnings per mile of road were $3,695.28; expenses, $2,466.34; net earnings, $1,228.94. The average receipt per passenger per mile, 4.38 cents; per ton per mile, 5.20.

This average of mileage earnings includes 56 miles of line between Sherman and Brookston, the earnings of which were $1,658.66 and the expenses $892.54 per mile. These earnings will hardly be increased until the line is finished to Texarkana. Deducting the earnings of this section, the receipts of the lines from Shreveport to Dallas and Marshall to Texarkana were $4,130.41 per mile; expenses, $2,764.67; net earnings, $1,365.74.

Under its land grant from the State of Texas the company has earned 5,644 certificates of 640 acres each. Of these the company has received 2,256, aggregating 1,443,840 acres, besides 286 certificates for 183,040 acres on account of road built by the Southern Pacific Company. Of the 2,542 certificates received, 1,000 have been placed in escrow under the agreement made with the Receiver of the Memphis, El Paso & Pacific Company, 1,232 have been applied to lands surveyed, 259 are on file to hold selected lands until surveys can be made, and 51 are on hand. The remaining 3,388 certificates due will be issued on payment of the usual fee. Satisfactory progress has been made in surveying and locating lands; those west of the Brazos River have been found much better than expected.

A summary of the income account is as follows:

Cash and material on hand		$179,353 12
Net earnings		393,509 48
Harrison County bonds		45,200 00
Loan account		25,000 00
Real estate and interest		337 38
California & Texas Construction Co.		141,175 86
Total		$784,575 84
Construction account	$209,497 62	
Land Department	67,502 53	
Office expenses, taxes and sinking fund	85,342 77	
Southern Pacific suits settled	1,066 72	
C. & T. Construction Co.	8,285 19	
Cash and material on hand	118,997 15	
Accounts collectable	25,710 06	
Reduction of floating debt	268,173 80	
		784,575 84

The President's report gives a long history of the formation of the company and of the absorption by consolidation or purchase of the Southern Pacific and the other companies which preceded it. It also states the circumstances which led to the formation of the California & Texas Railway Construction Company and the work done by that corporation. As to the later agreement between the two companies, it says:

"Of original stock capital subject to the hazards of the enterprise, $6,834,529.32 was paid in by stockholders of the construc-

tion company; and as that company had also a large indebtedness, with assets consisting almost entirely of Texas & Pacific securities that it was found impossible to sell after the panic of 1873; and as there seemed little prospect that it would soon be able to continue the work of construction under its contract, an agreement was made in March last between the two companies by which there was secured:

"1. A cancellation of the existing construction contract from that date.

"2. A reduction of the present cumulative interest-bearing debt of your company to $25,000 per mile, by calling in and retiring the outstanding construction bonds authorized to be issued at $40,000 per mile, none of which had been sold by the construction company or by the railway company, and substituting in lieu thereof *first*-mortgage bonds limited to $8,000 per mile on the lines east of Fort Worth—$2,500,000 of this issue to be used only in completing and equiping 120 miles of partly constructed line between Fort Worth and Dallas, and between Brookston and Texarkana; and *second* or *consolidated* mortgage bonds, $17,000 per mile, the two mortgages limited to $25,000 per mile in all; these consolidated bonds to be used in payment of indebtedness; both mortgages to carry 6 per cent. interest in gold.

"It was also agreed to issue an income and land grant bond not to exceed $17,000 per mile, to be exchanged at par for outstanding land grant bonds, the accrued interest thereon also to be funded in these bonds; the new bonds to have all the security of the old land grant bonds by first mortgege on the lands, and in addition, a mortgage on the income from the railway, in excess of what is required to pay $1,500 per mile of gold interest, and the sinking fund on $25,000 first and second-mortgage bonds; the construction company undertaking to return all the construction and land grant bonds it had received, as none had been sold.

"Under this arrangement, creditors representing 85 per cent. of indebtedness of the two companies have agreed to accept the consolidated mortgage bonds in satisfaction of their claims, which will leave $3,544,000 of first-mortgage bonds limited to $8,000 per mile, the entire issue on 443 miles, with which to complete 120 miles of partly-constructed line east of Fort Worth, and to satisfy about one million dollars of floating indebtedness, mainly of the construction company.

"The construction contract between your company and the California & Texas Railway Construction Company, now canceled and annulled by mutual consent, has proved one in which the advantages were greatly on your side, and the benefit your company has derived from it can hardly be *over*-estimated, as the arrangement by which the Texas & Pacific Railway Company full-paid capital stock is to be exchanged at par for the full-paid shares of the construction company will secure all the advantages of an original subscription of nearly eight and one-quarter million of dollars to the capital stock of your company."

As to the prospect of the future work, the report says: "It is proper to state that your board feel confident the lines east of Fort Worth will be completed within a year, and when completed, that they will be able to take care of all interest-bearing securities issued upon them; but the extension of your line from Fort Worth westward to the Pacific must depend upon the future action of Congress."

The report closes with an account of the measures taken to secure from Congress a guarantee of interest upon the bonds.

RAILROAD LAW.

Liability for Frightening a Horse by Whistling.

In the case of the Philadelphia, Wilmington & Baltimore Company against Stinger, appeal from the Philadelphia County District Court, which was a case where the defendant in error was driving a horse, known to be afraid of locomotives, along a road parallel and near to the track, and the engineman of an approaching train sounded the whistle, causing the horse to run away and throw the man to the ground, injuring him, for which injury he brought suit to recover damages, the Supreme Court of Pennsylvania held: 1. That the question whether the use of the whistle in that case was negligent was for the jury to decide, but not whether any use of the whistle was negligent. 2. That the use of a horse known to be afraid of locomotives in the vicinity of a railroad was contributory negligence. The judgment of the lower court, giving damages, was reversed and a new trial ordered.

Condemning Land Belonging to a Corporation.

The New York Central & Hudson River Company recently brought suit to compel the Metropolitan Gas Company to sell property at Sixty-eighth street and Eleventh avenue. The Supreme Court Chambers sustained the claim, on the ground that the land was necessary for the carrying on of the railroad's business, and that therefore it had a right, under its charter, to compel the sale. Commissioners were appointed by the Court to estimate the price for which the gas company should be compelled to convey the property to the railroad company; whereupon the gas company appealed to the General Term, and the latter Court has decided, sustaining the lower Court's order, on the ground that the gas company being a corporation does not save its property from the effects of the law of eminent domain, when its use is necessary to a railroad corporation to complete the objects of its charter.

Liability of Carrier for Injury to Stock in Charge of Owner's Agent.

The suit of Bowie against the Baltimore & Ohio company, in the Supreme Court for the District of Columbia, was brought to recover damages for a race-horse injured while being transported in the defendant's cars. In this case the horses were accompanied by the agent of the owner, assisted by several persons, three of whom were riders accustomed to ride the horses at races, who traveled with and took care of them. There was a difficulty about loading one of the horses on the car, and the agent insisted on loading as he thought best, after having been requested by the railroad employes to place the horse under their control. The Court held that, under these circumstances, the company was not liable.

Garnisheeing a State Railroad.

The Atlanta (Ga.) *Herald* says: "Some time ago a merchant of this city served a summons of garnishment upon the Commissioners of the Macon & Brunswick Railway, in order to secure a debt that was due him by one of the employees of the road. The summons was resisted by the Commissioners, on the ground that the road being the property of the State the Commissioners were simply agents of the Executive, and as such cannot be brought into court as a party to a suit.

"As the State cannot be sued, neither can any of its agents, acting as such: nor can its property be made liable to levy and sale to satisfy any claim that might be made against it, therefore the Commissioners of the road cannot be made parties to any suit, nor is its property liable to be levied on and sold under execution.

"The court coincided in this opinion and the case was decided against the garnisher."

The case was to have been carried up to the Supreme Court.

Duty of Steamboats to Avoid Striking Bridges.

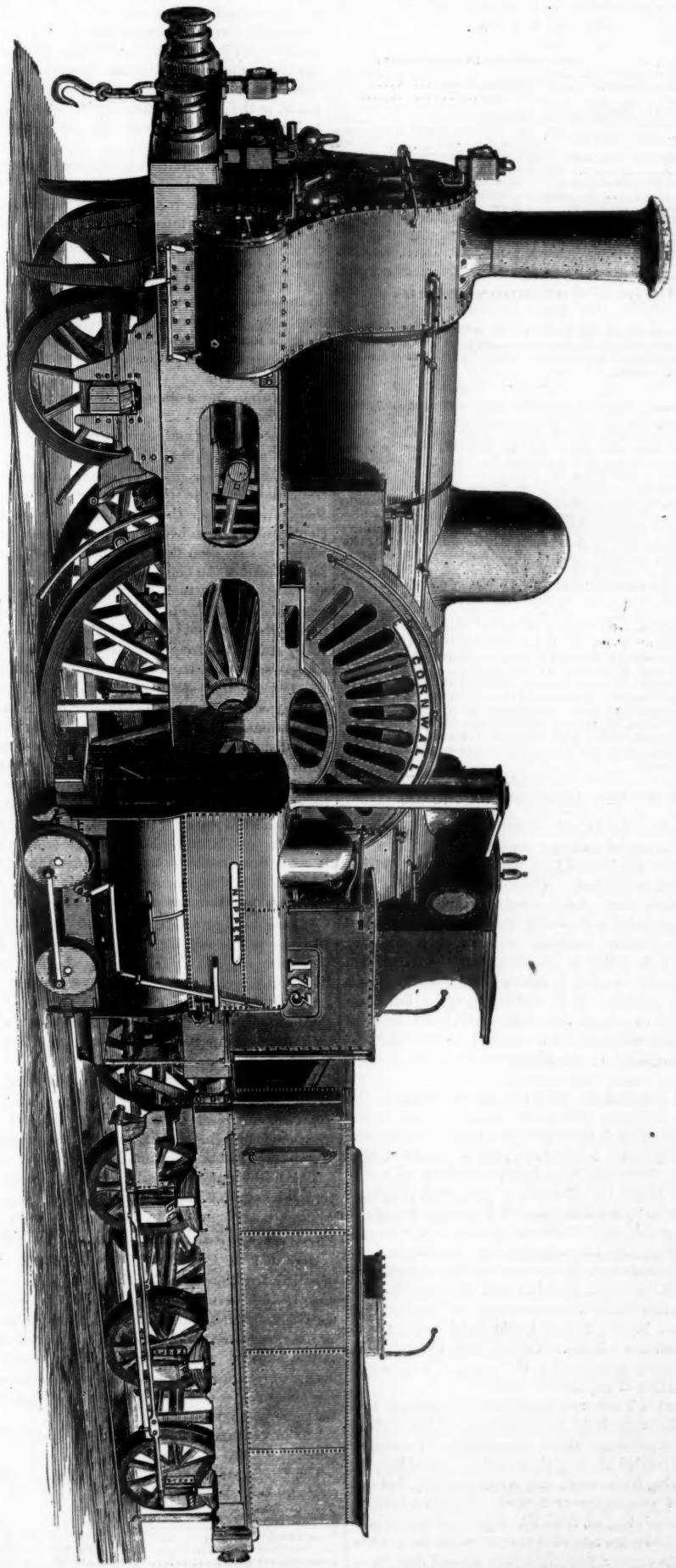
In the case of the Northwestern Union Packet Company against the Home Insurance Company, the United States Supreme Court delivered an opinion last fall, which contains the following passage:

"The officers of the steamers plying the Western waters must be held to the full measure of responsibility in navigating streams where bridges are built across them. These bridges, supported by piers, of necessity increase the dangers of navigation, and river men, instead of recognizing them as lawful structures built in the interest of commerce, seem to regard them as obstructions to it, and apparently act on the belief that frequent accidents will cause their removal. There is no foundation for this belief. Instead of the present bridges being abandoned, more will be constructed. The changed condition of the country, produced by the building of railroads, has caused the great inland waters to be spanned by bridges. These bridges are, to a certain extent, impediments in the way of navigation; but railways are highways of commerce as well as rivers, and would fail of accomplishing one of the main objects for which they were created—the rapid transit of persons and property—if rivers could not be bridged. It is the interest as well as the duty of all persons engaged in business on the water-routes of transportation to conform to this necessity of commerce. If they do this, and recognize railroad bridges as an accomplished fact in the history of the country, there will be less loss of life and property and fewer complaints of the difficulties of navigation at the places where these bridges are built. If they pursue a different and contrary course, it rests with the courts of the country, in every proper case, to remind them of their legal responsibility."

"Dignity and Impudence."

The engraving here published with the above title is copied from our contemporary *Engineering*, which describes it as follows:

"It well illustrates the vast range in the sizes of modern locomotives, has been prepared from a photograph, for which we are indebted to Mr. F. W. Webb, the Locomotive Superintendent of the London & Northwestern Railway, and it represents one of the large express locomotives in use on that line side by side with one of the energetic little engines which do such good work on the line of 18-in. gauge laid through the Crewe works. The combination at once suggests 'the well-known picture of the late Sir Edwin Landseer—'Dignity and Impudence.'"



—In Detroit recently a deputation of the employes of the Detroit & Milwaukee road waited upon Mr. W. K. Muir, late Superintendent of the road and now General Manager of the Canada Southern, and presented him with an address, expressing the esteem in which he was held and the regret of the employes at his departure.

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Editorial Announcements.

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

BRITISH AND AMERICAN RAILROADS.

The Report of the British Board of Trade, containing the returns of capital, mileage, traffic and expenditures of the railroads of the United Kingdom for the year 1874, has recently been published. These returns, which have now been made for a long series of years in the same form, give probably with much accuracy the facts called for under the various headings—at least their accuracy seems never to be called in question—but the facts called for are themselves extremely meagre, and the report as a whole is less complete than that of any other European country so far as we are acquainted with such Governmental reports, and not for a moment to be compared with those required by the Massachusetts Railroad Commission.

The great defect of the Board of Trade returns is the lack of any sufficient account of the work done by the railroads; and this is the more lamentable because the published corporation reports are just as barren of this information—almost the most indispensable of all to enable one to estimate the efficiency of a railroad. Indeed, if we may judge by English railroad literature, reports of railroad companies, the speeches of presidents at the half-yearly meetings, the interrogatories of anxious or suspicious shareholders on the same occasions, and the discussions in the technical societies and journals, English railroad men and shareholders never seem to imagine that there is or can be any unit of traffic which may serve to measure quantities of railroad work; and the only criterion of economy mentioned is the utterly fallacious one of the proportion of expenses to earnings.

In the Board of Trade reports the nearest approach to a measure of the traffic is the train mileage, which is given for freight and passenger trains separately. The number of passengers carried of every class, and of tons of freight, with the earning from each, are given carefully, but not the mileage of passengers or freight. Thus we have no means of ascertaining, or, from the report, of approximating even, the average rate paid per passenger and per ton per mile. The regular passenger rates are not difficult to ascertain, being usually published in guide books; but so large a proportion of the passengers travel on "mileage," "return," "excursion" and "season" tickets that even this does not enable us to more than guess at the average rates received; and as to freight rates, we are all at sea. Now and then the trial of a case before the Railway Commission mentions the rate in some especial case but so far as the returns are concerned, we have nothing more definite than that the train mileage of freight trains has been so much, the total tons carried so much, and the receipts for carrying it so much.

Of course the absence of such information prevents the forming of an intelligent judgment on the British railroads. Observation enables us to say what is the quality of the work they do, but we cannot say how cheaply they do it, for no one knows how much they do.

In many respects British railroads have great advantages for doing work with economy: many of them have an enormous traffic. But after all, and notwithstanding the cheapness of materials and labor, probably if all the facts were known it would be found that their average charge per ton per mile is higher than that on American railroads with much lighter traffic, and than on Continental railroads, as the passenger rates for the same classes are known to be higher than in almost any other country where the traffic is considerable.

Railroad transportation in England, however, is doubtless better in quality than in any other country in the world. True, there are comforts in American passenger cars, especially on long journeys, not to be had in the best English cars; but, on the other hand, the English traveler receives some things for his money which are very costly and usually not to be had here, and indeed nowhere else to the same extent. With freight this is still more the case; the English freight transportation is a different thing, a much costlier thing and in some respects a much more desirable thing than the American article that goes by the same name.

The two great excellencies of both freight and passenger transportation in England are: first, speed; and second, the reception and delivery of the persons and goods carried in the hearts of cities and at any of several points in the larger cities. The speed of English fast passenger trains is famous the world over; but it is not so well known that freight trains there run almost with the speed of Continental and many American passenger trains. Somewhere we have seen the speed of "goods" trains on a leading railroad of the United Kingdom given as 20 to 25 miles an hour, and it is said that goods destined for London from any part of England if shipped in the afternoon will usually be delivered before the close of the next day. This really makes the freight service nearly equivalent to our express service. It is rendered possible not only by the fast average speed of freight trains (which is extremely costly), but by the bringing of the railroads into the business centers of cities, and the establishment of several stations in the larger ones. How costly this work is in a city like London the history of the Metropolitan has shown; but the Metropolitan lines are but a fraction of a system of railroads within the city of London, and the cost of works of this kind, which serve simply to bring the goods and passengers close to the stores and houses, thus reducing to a minimum the enormously expensive and slow transportation by horses through city streets, is something tremendous.

If then, as is probable, the work of English railroads costs the public and the railroads more than elsewhere, something is given for this increased cost; and if we had the average receipt and expense per ton and per passenger per mile, we could not base our judgment of the relative economy of the English and American systems solely on a direct comparison of these figures in the two countries.

In the following figures we have reduced the values given in the Board of Trade report in sterling money on the basis of $4.8665 per pound, so that all the dollars mentioned are gold dollars, representing a seventh or an eighth more just now in American currency.

The following statistics of British railroads are taken from the Board of Trade Report:

	1874.	1873.
Mileage at close of year	16,449	16,082
Mileage of double track	8,749	.....

Here we have an increase during the year of 367 miles of railroad. This, even in these dull times for railroad construction, seems very little in this country; but we should remember that not only is Great Britain a small country, easily covered by one of our States, but that its railroads years ago penetrated almost every nook and corner of its area. The proportion of increase for the year was about 2¼ per cent., and ours in the United States for the same year was only 3 per cent.

The proportion of double track is a little more than 53 per cent.

The capital, revenue and expenses of the British railroads for two years have been:

	1874.	1873.
Paid up capital	$2,968,058,548	$2,863,064,779
Gross receipts	288,367,937	281,011,067
Receipts from traffic	276,901,407	270,944,332
Passenger receipts	121,148,927	116,092,275
Freight receipts	155,761,964	154,865,774
Working expenses	158,715,199	149,663,860
Net earnings	129,652,738	131,347,207

Here we have an increase of nearly 4 per cent. in the capital of the British railroad system (the increase in mileage having been only 2¼ per cent.), an increase of 2.6 per cent. in its gross receipts, 2.2 per cent. in the receipts from all traffic, 4⅝ per cent. in passenger receipts, 0.6 per cent. in freight receipts, 6 per cent. in working expenses, and a decrease of 1.3 per cent. in net earnings. Thus the expenses grew faster than the earnings, whether on account of a reduction of the average rates, we cannot learn from statistics, but probably so, as business has been extremely dull in Great Britain as well as here, and prices of materials and labor were lower; and under such circumstances it ought to be possible to do a given amount of work at less cost, while it is natural to expect that much traffic would not move at all if not taken at rates lower than those charged in prosperous times.

It will be easier to grasp the figures for the above items when given per mile of road, as below:

Per mile:	1874.	1873.
Capital paid in	$180,440	$178,029
Total receipts	17,531	17,474
Traffic receipts	16,834	16,848
Passenger receipts	7,365	7,219
Freight receipts	9,469	9,629
Working expenses	9,649	9,306
Net earnings	7,982	8,168

This shows that the increases were largely due to the increase in mileage—the gross receipts increased little more than 3 per cent., the total traffic receipts less than one-tenth of one per cent. (the passenger receipts increasing 2 per cent. and the freight receipts decreasing 1⅞ per cent.), the working expenses increasing 3⅔ per cent., and the net earnings decreasing 3½ per cent. It is notable that in Great Britain working expenses increased at the same time that they decreased here.

Percentages:	1874.	1873.
Of expenses to receipts	55.04	53.26
Of passenger to total receipts	42.01	41.31
Of freight to total receipts	54.01	55.11
Of net earnings to capital paid in	4.37	4.59

The increase in the percentage of working expenses was probably due to a decrease in the average freight rate (though we have not seen it stated that there has been such a decrease). This percentage has for many years shown a tendency to increase. Formerly 50 per cent. was thought a high percentage. English journals are always wondering at the "high cost" of working American railroads, and speculating over the causes that made 65 per cent. an average here when British roads were worked for 50 per cent. Owners of Erie, Atlantic & Great Western and Grand Trunk securities are promised larger returns when new improvements have made it possible to work those roads for 65 per cent. of the gross earnings, and we remember that Captain Tyler gravely reported that with proper improvements the Erie ought to be worked for two-thirds of its receipts. Whether he calculated on a basis of a 45 cents fourth-class rate from Chicago to New York, which is what the railroads charge when they can get it, or on a 30 cents rate, which is what they take now, we are not informed; but if the former, evidently the roads should only be making working expenses at the current rate. We imagine that the English railroads are having an experience somewhat like ours: they are carrying a larger traffic than formerly, at a somewhat smaller cost for the same service, and at a considerably less price, so that the proportion of working expenses grows even when coal, iron and wages are cheaper.

The growth in passenger earnings while freight earnings decreased is probably due to the fact that passenger rates were maintained, while freight was carried at lower average prices. The freight earnings, it will be seen, were a little more than the working expenses in 1873 and a little less in 1874.

The last figures give the general financial result of the working of the British railroads. Their net earnings were 4.37 per cent. on the capital invested in them in 1874 against 4.59 per cent. in 1873. The decrease in the rate of profit is nearly 5 per cent., but the profit is yet not a very unfavorable one in a country like England, where government bonds yield but 3 per cent. and ordinary temporary loans, even where money is in demand, generally bear not more than 5 per cent. We are safe in saying that a 5 per cent. income on an English investment is fully as satisfactory as a 7 per cent. income on an American investment. Now English as well as American railroads are uncertain investments, and should therefore aim to earn more than average interest on secured loans, and the interest actually earned is probably insufficient to induce such an investment. It is, however, relatively larger than the interest earned by American railroads.

The only other item concerning the British railroads that remains to be given is:

	1874.	1873.
Receipts per train mile	$1.3788	$1.3758

Here the increase is a single farthing—about one-sixth of one per cent.

We will now make some comparisons with American railroads, taking the results given in the last volume of Poor's Manual, which come nearest to covering the same year. A few figures will be given for the entire systems:

	British.	American.
Mileage	16,449	69,173
Capital invested	$2,968,058,548	$3,755,123,195
Total receipts	288,367,937	462,696,459
Passenger receipts	121,148,927	125,343,628
Freight receipts	155,761,964	337,303,942
Working expenses	158,715,199	294,351,161
Net earnings	129,652,738	168,507,518

Here we have reduced American currency to gold value on the basis of 111 for gold. This is necessary to any proper comparison of the receipts and expenditures of the year, but for the capital account it is not correct. A large part of the latter is in gold bonds, and in stocks issued in

the days of specie payments. The capital as given by Poor's Manual is $4,221,763,594. Probably $4,000,000,000 gold would better represent the face of the securities than the amount given in the table.

If we take the latter figure, however, we find that the railroads of the United States, more than four times as long as those of Great Britain, represent a capital but o e-third greater, their gross receipts are three-fifths greater, their working expenses six-sevenths greater, their net earnings three-tenths greater. Their earnings from freight were more than twice as great, but (what is, perhaps, more notable than anything else) the passenger earnings are very little greater—about 3½ per cent.

We will, however, make a closer comparison by putting the accounts per mile side by side:

Per mile.	British.	American.
Capital	$180,440	*$54,394
Gross receipts	17,531	6,678
Passenger earnings	7,365	1,809
Freight earnings	9,469	4,869
Working expenses	9,649	4,246
Net earnings	7,882	2,432

The gross earnings amount on the English roads to 9.71 per cent. of the capital; on the American, at the valuation in the table, to 12.28 per cent., or on the mixed valuation in gold and currency securities of $60,944 per mile, to 10.96 per cent.

Below we compare some of the proportions:

	British.	American.
Expenses to earnings	55.04	63.58
Gross earnings to capital	9.71	12.28
Net earnings to capital	4.37	4.50
Passenger to total earnings	42.01	27.09

The percentage of net earnings to capital, which is the measure of the profitableness of a system, is here given for American roads on the assumption that the capital and earnings are in the same currency, which is not the case. This error makes the percentage of profit appear too large; that is, we have reckoned currency interest on the gold as well as the currency capital. If one quarter of the capital is gold (we can only guess at the proportion), then the capital per mile reduced to gold is $55,866, and the net earnings of $2,432 gold value are 4.35 per cent. of the receipts—almost the same as the average profit of English railroad capital, and as much more unsatisfactory as the usual rate of interest is higher here than in Great Britain.

The large amount earned by passenger transportation on British railroads deserves the special attention of American railroad managers. The population of Great Britain and Ireland is about a fifth less than that of the United States, and a large part of it is a very poor population. Yet it appears last year to have spent nearly as much for railroad travelling as the population of the United States, which is greater by a quarter. Approximately the passenger earnings per individual were equivalent to $3.52 gold in Great Britain and to but $3.28 in this country, where the necessity of much travelling and long journeys is doubtless greater. The 24 cents more per individual would add more than ten millions to the net earnings of our railroads, and would have increased them last year by six per cent. There is no doubt whatever that our roads do a great deal of unprofitable passenger transportation, but that does not prove that they might not increase considerably that which is profitable. Certainly they ought to be able to earn as much in proportion to population from this branch of traffic as do the British railroads.

PASSENGER CAR CONSTRUCTION.

It is said that when wheelbarrows were first introduced into China, the natives filled them with dirt and then slung them to poles which were carried on the shoulders of pairs of lusty Celestials. It is also related that when postal cards were first introduced, persons in remote rural districts wrote their missives on them, and then inclosed them in envelopes to which they affixed three-cent stamps, and were surprised that such "convenient things" were not invented before. There are some things about the construction of passenger cars which call these stories to mind. Among them is the form of the roofs. Originally the roofs of cars were made just high enough for a tall man to stand erect under them with his hat on. Quite naturally when the first cars were built rafters were placed across the top, after the manner of the rafters of buildings, or of the old stage coaches. This form of roof was improved by the addition of what is ordinarily called a raised roof, monitor-top, or, more properly, clear-story, *A*, fig. 1. This was at first placed directly on the cross rafters, and with vertical sides, *a*, *a*, as shown in the engraving. In order to get greater width inside, and yet not widen the top outside, the sides of the clear-story were then inclined as shown in fig. 2. As they still rested on the rafters, it was necessary to carry the latter across the open space at the base of the clear-story. These rafters, it was thought, however, marred the appearance inside, and were therefore cut away, and the ends which remained were more inclined, as shown at *p*, *p*, fig. 3, so as to get a greater height inside, and also reduce their thrust against the sides of the car which is produced by the weight of the roof. Such roofs, like a great many young men (and women too) who make great sacrifices for appearances, are without any visible means of support. That is, the sides, or, what might be called the abutments of the roof, are not tied together, so that the lateral thrust of the rafters has a tendency to spread the sides of the car apart; or, in case of accident, they might be crushed together. It is also plain that the ends of the short rafters, *p*, *p*, fig. 3, have no other support than that which is due to the strength of the attachment of the other ends to the sides of the car. Whenever this form of construction is resorted to, it has therefore been found necessary to strengthen

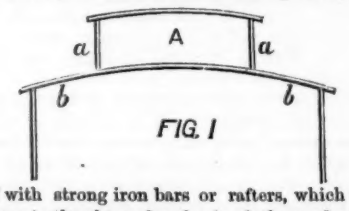

FIG. 1

the roof with strong iron bars or rafters, which are made to conform to the shape, *b a f a h*, of the roof and clear-story. These bars are securely fastened to the sides of the car and by their great strength give more or less stiffness to the roof. It will be seen, however, without any explanations of the reason, that such a form of construction gives very little strength for the amount of material employed; or, in other words, for the sake of appearance or display alone, it has been necessary to sacrifice good construction and incur expense. It is not surprising then that car-builders who employ this form of construct on should do all in their power to hide it. In the language of the politicians, they "point with pride" to the effect produced, but do all in their power to hide the means employed to produce it. In other words, such construc-

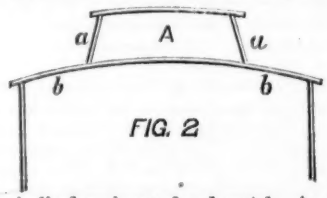

FIG. 2

tion is a vain lie done in wood and metal. Anything partaking of the character of legerdemain, that is, of doing things without a sufficient cause, is destructive to true art and good engineering. There is also an immoral element in the waste which is incurred when an expensive form of construction is adopted for the purpose of producing display alone, when a cheaper and better form would have answered all useful purposes quite as well. A skillfully designed piece of framing, or an ingeniously constructed roof truss in a car, will give a pleasure to a good mechanic or artist which no amount of useless ornament employed to cover up bad work is or should be capable of giving. The old Gothic architects when

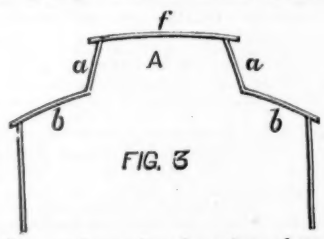

FIG. 3

they built roofs out of oaken beams which were intended to and did endure for centuries, did not take pains or spend money to hide their work, but they did it so skillfully that they were proud to have it seen. The same thing should be true of car-building. If the design and construction of a car roof is really good, there is no occasion for hiding it by covering it with headlining or casing and mouldings which are in themselves quite useless. All mechanics, and we might add other people, when they do absurd things are anxious to hide them. If, for example, a person wanted to build a bridge across a stream, and should first lay a piece of timber across and should take a saw and cut a piece out of the

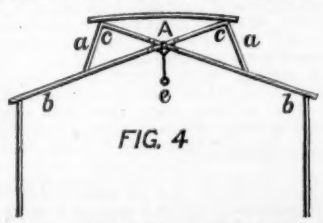

FIG. 4

middle of the timber, and then support it with an iron bar over the gap left by the piece removed, quite likely most prople would regard it as a most absurd method of building a bridge, and the constructor would regard it as imperatively necessary that his truss should be boarded up in order "to give it a finish." Now the form of roof shown in fig. 3, which is now so commonly used on cars, is as an engineering structure quite as absurd as such a bridge would be.

There is another practice in passenger-car construction which is also very absurd and costly. We refer to that of using wood in curved forms for which it is not adapted, such as the tops of windows, the corners of cars and the arm-rests for seats. The increased expense of a car, with round-topped windows, we are told, is from $400 to $500. Now this form for the top of a window originated from arched masonry structures, in which, and with the material employed, it is the strongest form of construction. But it is absurd to use wood to imitate a structure made of a material so entirely unlike it as stone is. An arch is, of course, a very beautiful form of construction, but then it is not the only form which is beautiful. Each material has some special fitness or adaptation for certain forms of construction or ornament. What we assert is, that the arch is not adapted for structures made of wood. If the money expended in making round-topped windows was expended in forms of construction to which wood is adapted, very much better and more beautiful cars could be built. To make round-topped windows in cars is, in other words, a wasteful expenditure of money, because so much more can be accomplished if it is expended in other ways. The same thing is true of round corners of car-bodies, round forms in the roof, seats, etc. Every one knows that a curved rafter, unless the wood is bent, has very little strength. In many roofs made similar to that shown in fig. 3, not only are the rafters curved much more than represented, but the angle between *a* and *b* is worked into a long curve, so as to give it a more graceful appearance. The result is that this work is all expensive, and in order to have the requisite strength must be made very heavy. Now what we wish to propose to car-builders is the adoption of a form of construction like that shown in fig. 4. That is, make the rafters straight and carry them up direct from *b b* to the corners *c c* of the roof of the clear-story. They would cross each other at *A*, and should be notched into each other where they cross, and in order to compensate for the material cut out of them for the notches, metal plates nickel-plated or bronzed could be screwed fast to them on each side, which would also serve to strengthen the rafters at that point. Being straight, the rafters could readily be finished up, and by chamfering their corners could be made to look very well. The outside sheathing or boarding for the roof could also be furnished, and all head lining then discarded, and the whole inside of the roof either varnished or painted. Such a form of construction would be very much stronger, could be lighter, and would be much cheaper than that shown in fig. 3. The same kind of finish that we propose is much used in street cars, and, as all know who ride in them, looks very well.

It is not only in the roofs of cars that we find bad construction and bad taste. The whole finish inside is usually gaudy, expensive, and in many cases very ugly. We commented last week on the method employed by the Boston & Providence Railroad Company to procure the best design for their new depot in Boston. Now it is a fact, which we believe car-builders themselves will recognize, that although as a class they are skillful and have what is next to righteousness the highest virtue, that of knowing their business, yet not many of them are distinguished for æsthetic culture. Now without such training in the architects who designed the Boston & Providence depot, that building would have been impossible. Now what is needed in the construction of cars is the employment of some equally well trained persons to design the ornamental part of them. In completing the building to which we have referred, the company did not dispense with the services of the architects when the building itself was finished, but nearly all the furniture was also selected by them. This is designed with the same good taste as the building, and shows everywhere that the author of it was well trained for such work.

Some reform is also needed in the construction of car seats. These are usually too narrow for comfort, and weigh a great deal more than they should. We have been surprised that no one has yet designed a car-seat arm made of bent wood. It could be made certainly much lighter and stronger than either the ordinary wooden or the cast-iron arm, and also we believe more comfortable than either. We recommend this field of production to some lazy man who has a fine sense of comfort, and knows what it is to be at ease bodily.

Of ventilation, we will add, that there is some reason for thinking that the idea that it is necessary to provide some means of admitting fresh air into a car has now come to be recognized, and therefore it is probable that the necessity of doing so will not be entirely ignored hereafter.

It should not be forgotten, however, that in the construction of passenger cars, the first and most important thing to be aimed at is safety; second, comfort, which includes cleanliness; and lastly, ornament. We would like to add Ruskin's rule for the latter, which is: "ORNAMENT YOUR CONSTRUCTION; DO NOT CONSTRUCT YOUR ORNAMENT."

Petroleum Fuel.

A recent report on a method of melting iron with petroleum fuel, by Prof. Henry Wurtz, of the Stevens Institute of Technology, gives what we may call the equations of petroleum and coal, which, as apparatus for burning petroleum for locomotive and other engine fuel are frequently presented for trial and

* Again we note that the figures for capital are made somewhat too small by reducing currency to gold, a part of the capital being in gold bonds. The capital per mile as it appears by dividing the gross amount of securities of all classes by the mileage is $60,944.

adoption, mechanical engineers would do well to keep in mind.

Sainte-Claire Deville, experimenting for the French Government, found in oil from Oil Creek, which will pretty fairly represent average American crude petroleum, a total calorific power of 9,963 centigrade units, equal to the evaporation of of 16.17 lbs. of steam per pound of oil, and he was able practically to evaporate 14.05 lbs. with a pound of this petroleum. Now a pound of pure, dry charcoal has a total theoretical heat of 7,990 units, and the oil thus has a greater evaporative power by just about 25 per cent. A gallon of petroleum weighs about 6⅝ lbs., so a gallon has the heating power of 8⅓ pounds of pure charcoal, and a barrel of 42 gallons is equivalent to 350 lbs. of such charcoal, and 6⅓ barrels of oil are equivalent to one long ton of charcoal.

Pure, dry charcoal, however, is hardly to be got except for chemical experiments, and the ordinary charcoal of commerce has only about three-fourths as great heating power. Not being used to make steam, it need not be considered further.

The theoretical heating power of the best British coals is given as between 14 and 15 lbs. of steam per pound of coal, or nearly as great as that of petroleum; but the great advantage claimed for petroleum is the nearly complete utilization of its heating power, owing to its perfect and even composition, and the easy management of the heat arising from it. Thus the best practical result of the British Admiralty experiments with the best coal was the evaporation of 9.5 lbs. of steam per lb. of best coal, while Sainte-Claire Deville evaporated 14.05 lbs. with a pound of petroleum, and Professor Wurtz says, "with perfect combustion and skilled handling, we may safely adopt, as the actual steam value of our petroleum, fifteen pounds of water made into steam by one pound of oil." This is just 100 lbs. per gallon of oil.

By United States navy experiments, Lackawanna anthracite evaporated 9.8 lbs. of water per pound of coal; Cumberland bituminous 9.44 lbs.; and Pittsburgh bituminous (which is most likely to come into competition with petroleum) 8.2 lbs. On this basis:

1 gallon oil = 10.2 lbs. Lackawanna,
= 10.6 lbs. Cumberland,
= 12.2 lbs. Pittsburgh,

and a long ton of

Lackawanna = 219.6 gallons petroleum,
Cumberland = 211.3 " "
Pittsburgh = 183.6 " "

This, be it remembered, is the comparison of the actual effectiveness of the coals used in the navy experiments with the almost perfect utilization of the heating power which Professor Wurtz anticipates from the use of petroleum. Given the prices of coal and petroleum, and assuming the correctness of the statements made by the advocates of petroleum, it will be easy to ascertain which is the most economical fuel, where steam is made under advantageous circumstances. With the best coal above named, about five barrels of petroleum will take the place of a ton of coal; with the poorest, about 4¼ barrels. By the New York wholesale price of oil last week, it would require $11.50 to buy the value of a ton of Lackawanna, $11.08 for the value of a ton of Cumberland, and $9.65 for the value of a ton of Pittsburgh. At the Oil Creek wells, a little less than half as much money would buy the same quantity of oil. Lackawanna steamer coal is quoted at $5.10, wholesale, at the coal docks opposite New York, and Cumberland about the same.

The claims of the advocates of petroleum, however, are not only based on the practicability of the more complete utilization of the total heating power of the liquid fuel, but of its practicability under circumstances where coal is very imperfectly utilized. For instance, they claim that such complete, or nearly complete, utilization is practicable in locomotives, where coal, we know, is not so effective as in furnaces with larger heating surface where the fire is less violently urged. One of the peculiarities claimed for petroleum is its availability for making an intense heat without waste, either by non-combustion of particles or the escape of a great part of the heat up the chimney. Further, the perfect combustion of petroleum, leaving neither coal nor cinders, is advanced as a recommendation of the fuel where these products of ordinary coal fires become a nuisance, as in most engines in cities and especially in locomotives designed for use in city streets.

All these comparisons, it must not be forgotten, are made on the assumption that a pound of crude petroleum will evaporate 15 pounds of water—will do the best work claimed for it by those who advocate its use; and the chief value of the figures given will be to show where petroleum cannot rather than where it can be economical.

Record of New Railroad Construction.

The last number of the *Railroad Gazette* had information of the laying of track on new railroads as follows:

Chicago, Saginaw & Canada.—Extended from Alma, Mich., westward 9 miles to Elm Hall.

South Bay.—Track is laid for 4 miles from Eureka, Cal.

This is a total of 13 miles of new railroad.

This number of the *Railroad Gazette* has information of the laying of track on new railroads, as follows:

Central of New Jersey.—The *Long Branch Division* is extended from Long Branch, N. J., southward 5 miles to Ocean Grove.

Pennsylvania.—The *Madera Extension* of the *Moshannan Branch* has been laid from Houtzdale, Pa., for 2 miles to Kendrick coal shaft.

This is a total of 7 miles of new railroad, making 614 miles completed in the United States in 1875, against 962 miles reported for the same period in 1874, 2,252 in 1873 and 3,962 in 1872.

ERIE SHAREHOLDERS are a class of whom it has not been easy to get any definite information, largely, doubtless because most of them did not remain shareholders long at a time. And in considering the statements below it should be remembered that transfer books may not and doubtless do not indicate with anything like accuracy the present holdings.

In the application of John Livingston and others to the New York Supreme Court to set aside the late election of directors, it is stated that the complainants ascertained by examination of the transfer books that the whole number of shareholders recorded is 4,270, of whom 3,313 are holders of common stock and 957 holders of preference stock. Residents of foreign countries hold 661,985 shares, 51,500 of which are preferred shares. Residents of the United States hold 204,015 shares, 34,500 being preferred. Of the holders, 701 hold ten shares or less, 1,710 hold fifty shares or less; 681, one hundred shares or less; 1,089 one thousand or less; and 89 hold more than 1,000 shares.

The average holding of preferred shares was thus 88.8 shares; of common, 235.4 shares.

The holdings of the directors chosen at the late election amounted to 1,246 shares, which, if all common shares, make the present value of their stake in the concern less than $19,936, while if the shares were at par it would be but $124,600. Their holdings are one-seventh of one per cent. of the whole stock, and their average holdings are 73 shares, which is below the average holding of the whole body of holders of common stock.

THE TEXAS & PACIFIC REPORT, a summary of which we publish elsewhere, gives interesting information of the financial results of this enterprise so far, and of its future prospects. Really the earnings of that part of the road that deserves to be called completed—for the line from Sherman eastward, having no good outlet, is not in condition to carry traffic to advantage—have been very good—$4,130 per mile, about $1,240 of which was net, the country being comparatively new, and the large lands not yet available. The company expects to complete all the lines east of Fort Worth next year, and it will then have, irrespective of any further extension, a complete and well placed system of roads, with outlets north, east and south, through a fertile and growing country, not crowded with railroads like many of the new States of the Northwest, and one quite sure to become profitable within a limited period of time.

THE GENERAL PASSENGER AND TICKET AGENTS' ASSOCIATION will hold its next half-yearly meeting on the 17th inst., at Saratoga. Mr. S. E. Mayo, of the Delaware & Hudson Canal Company's railroad, and Mr. C. E. Durkee, of the Adirondack Railroad, are making the arrangements for it. The attractions of the place, as well as the business to be done, will doubtless help to call out a full attendance and a larger than usual attendance of the families of members.

General Railroad News.

PERSONAL.

—Mr. Edward H. Tracy, Chief Engineer of the Croton Aqueduct, New York, died at his residence in Carmel, N. Y., August 28, of heart disease. He was an engineer of long standing, his first work having been on the Chenango Canal, under Mr. John B. Jervis, in 1838. Subsequently he had charge, as Division Engineer, of the construction of a section of the Croton Aqueduct, including the famous High Bridge over the Harlem River. In 1852 he became connected with the Morgan Iron Works in New York, which he left a few years later to make surveys for a ship canal from Lake Champlain to the St. Lawrence for the Canadian Government. He afterwards prepared plans for the slack-water navigation of the Des Moines River and made surveys for the Mississippi & Missouri road, now the Iowa Division of the Rock Island. He afterwards had charge of the removal of McComb's Dam and other obstructions in the Harlem River, and was appointed Chief Engineer of the Croton Aqueduct in 1870.

—Mr. Bayard Boyd, of Middletown, N. Y., for many years Paymaster of the Erie Railway, died August 26, while on a visit to his son at Clinton, Ill. He was 60 years of age.

—Mr. F. T. Carrington, a well known and wealthy business man of Oswego, N. Y., died in that city August 25. He was the leading projector of the Oswego & Syracuse Railroad, and was President of the company for several years.

—Hon. John J. A. Quealy, President of the Quealy Car & Iron Works and an esteemed citizen of Hannibal, Mo., died in that city August 27. He was also connected with the North Missouri Construction Company and other enterprises.

—The Republican Central Committee of Minnesota has nominated ex-Gov. Wm. R. Marshall as Railroad Commissioner in place of Charles A. Gilman, who was nominated by the convention, but proved to be ineligible. Governor Marshall was Chairman of the Central Committee when he was nominated.

ELECTIONS AND APPOINTMENTS.

Southern Maryland.—Mr. N. F. Cleary has been appointed Receiver for all the property in the District of Columbia.

Columbus & Toledo.—Col. Charles S. Miller is Assistant Chief Engineer. Messrs. J. N. Beemer, M. R. Schwamecker, C. McGrath, W. R. Gillis and Ford have been appointed assistant engineers in charge of subdivisions under construction.

Huron & Quebec.—At a meeting of the stockholders in Goderich, Ont., August 3, the following directors were chosen: W. Cluxton, D. W. Dumble, W. H. Scott, W. Toole, Peterborough, Ont.; H. Calcutt, Ashburnham, Ont.; C. A. Boulton, Lakefield, Ont.; F. W. Glen, Oshawa, Ont. The board subsequently elected W. Cluxton, President; F. W. Glen, Vice-President; W. Beal, Secretary; W. Cluxton, Treasurer; John Fowler, Manager; W. H. Scott, Solicitor.

Gilman, Clinton & Springfield.—Mr. Charles S. Seyton has been placed in charge of the road as agent for the trustees, who are now in possession. He has appointed Mr. T. J. Hudson Superintendent, and Mr. J. W. Lane Auditor and General Ticket Agent.

Fort Scott, Southeastern & Memphis.—The first board of directors of this new company is as follows: Charles F. Drake, Benjamin P. McDonald, Lewis C. Nelson, Fort Scott, Kan.; George H. Nettleton, Charles H. Prescott, Kansas City, Mo.

Canada Southern.—Mr. Webster, late Division Superintendent on the Great Western, has been appointed General Superintendent. Mr. F. E. Snow has been appointed General Passenger and Ticket Agent. His headquarters will probably be in Detroit.

Indianapolis & Springfield.—At the annual meeting in Indianapolis, Aug. 26, the following directors were chosen: W. M. Hess, J. B. Homan, L. M. Campbell, Danville, Ind.; N. W. Ader, John Starr, James Bridges, Bainbridge, Ind.; J. M. Nichols, A. K. Stark, Rockville, Ind.; W. C. Donaldson, G. W. McClure, Montezuma, Ind.; W. W. Curry, T. D. Kingan, Indianapolis, Ind.; John Lee, Crawfordsville, Ind. The board elected John Lee, President; W. M. Hess, Secretary; J. M. Nichols, Treasurer.

Hempstead & Montgomery.—The officers of this new company are: President, R. W. Crawford; Vice-President, J. C. Amsler; Secretary, Henry L. Rankin; Treasurer, R. R. McDade. The office is in Hempstead, Texas.

Chicago & Michigan Lake Shore.—It is reported that Mr. A. H. Morrison is to have the office of General Manager of this road again, Mr. Kimball, the present General Superintendent, retiring.

Western North Carolina.—The Governor of North Carolina has appointed as Commissioners to take charge of this road on behalf of the State, W. W. Rollins, of Madison, G. M. Roberts and W. S. Pearson, of Buncombe. Col. Tate is Commissioner on behalf of the stockholders.

Springfield, Western & Southeastern.—The first board of directors consists of James Abbott, H. E. Havens, J. T. Keet, L. H. Murray and Charles Sheppard. The officers are: L. H. Murray, President; H. E. Havens, Vice-President and Managing Director; Charles Sheppard, Secretary and Treasurer. The headquarters of the company are in Springfield, Mo.

Marquette, Houghton & Ontonagon.—C. H. Palmer, Jr., having resigned the position of Assistant Superintendent, to take effect September 1, 1875, the track, bridges, docks and buildings will be placed in charge of Mr. C. H. V. Cavis, Chief Engineer, and the foremen of these departments will hereafter receive their directions from and make their reports to him at Marquette, Mich.

TRAFFIC AND EARNINGS.

Coal Movement.

Returns of coal tonnages for the week ending August 21 are as follows:

	1875.	1874.	Inc. or Dec.	P c.
Anthracite	548,917	317,117	Inc. 231,800	73.1
Semi-bituminous, Broad Top and Clearfield	23,766	.....	.....	....
Cumberland	51,573	.....	.....	....
Bituminous, Barclay	7,324	.....	.....	....
" West'n Pennsylvania	39,474	.....	.....	....
" West Virginia	3,205	.....	.....	....
Coke, Western Pennsylvania	15,414	.....	.....	....

The coal tonnage of the Pennsylvania Railroad for the second week in August was as follows:

	Tons.
Anthracite	19,604
Bituminous	65,151
Coke	15,422
Total	100,177

Flour and Grain Movement.

Receipts and shipments for the week ending Aug. 21 are reported as follows, flour in barrels and grain in bushels:

Flour:	1875.	1874.	Inc. or Dec.	P. c.
Lake ports' receipts	83,386	101,773	Dec.. 18,387	18.0
" " shipments	94,769	92,203	Inc... 2,566	2.8
Atlantic ports' receipts	162,547	189,721	Dec.. 27,174	14.3
Wheat:				
Lake ports' receipts	1,199,356	2,431,532	Dec.. 1,232,176	50.7
" " shipments	999,075	1,976,598	Dec.. 977,523	49.5
Atlantic ports' receipts	1,678,058	1,142,676	Inc.. 535,382	46.8
Grain of All Kinds:				
Lake ports' receipts	3,684,639	4,944,790	Dec.. 1,260,151	25.5
" " shipments	2,658,444	3,076,530	Dec... 418,086	13.6
Atlantic ports' receipts	3,004,929	2,872,268	Inc... 132,661	4.6

Of the grain shipments from lake ports for the week, 27 per cent. went by rail in 1875, 16 per cent in 1874 and 20 per cent. in 1873.

A railroad officer who has been traveling through the Northwest, estimates that the country on the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul roads will have 12,000,000 bushels more wheat than last year to send to market.

Chicago grain receipts for the week ending Aug. 28 were 1,753,287 bushels in 1875, against 2,805,303 in 1874, a decrease of 38 per cent. The shipments were 2,143,752 in 1875, and 1,817,013 in 1874, an increase of 18 per cent.

Railroad Earnings.

Earnings have been reported by the following companies:

Year ending June 30: 1874–75.	1873–74.	Inc. or Dec.	P. c.
Indianapolis, Cincinnati & Lafarette	$1,767,231	$1,859,475	Dec.. $92,244	5.0
Expenses	1,056,312	1,198,011	Dec.. 141,699	11.8
Net earnings	$710,919	$661,464	Inc.. $49,455	7.5
Earnings per mile	9,873	10,388	Dec.. 515	5.0
Per cent. of expenses	59.77	64.43	Dec.. 4.66	7.2

Seven months ending July 31: 1875.	1874.		
Indianapolis, Bloomington & Western	$681,097	$985,171	Dec.. $304,074	30.9
Mobile & Ohio	885,436	1,203,317	Dec.. 317,881	26.4

Six Months ending June 30:			
Missouri, Kansas and Texas	$1,233,103	$1,444,990	Dec.. $211,887	14.7
Expenses	686,024	975,521	Dec.. 289,497	29.7
Net earnings	$547,079	$469,469	Inc... $77,610	16.5
Earnings per mile	1,569	1,838	Dec.. 269	14.7
Per cent. of expenses	55.63	67.51	Dec.. 11.88	17.6

Month of July:			
Mobile & Ohio	102,101	119,047	Dec.. 16,946	14.2
Philadelphia & Erie	322,837	313,615	Inc.. 9,222	2.9
Expenses	202,423	231,291	Dec.. 28,868	12.5
Net earnings	$120,414	$82,324	Inc.. $38,090	46.3
Earnings per mile	1,121	1,089	Inc.. 32	2.9
Per cent. of expenses	62.70	73.75	Dec.. 11.05	15.0

First Two Weeks in August:			
Denver & Rio Grande	15,900	16,341	De.. 441	2.7
St. Louis, Iron Mt. & So.	128,435	114,113	Inc.. 14,322	12.6

Week ending August 6:			
Great Western	£14,915	£17,611	Dec.. £2,696	15.3

Week ending August 7:			
Grand Trunk	£33,200	£39,400	Dec.. £6,200	15.7

Week ending August 13:			
Great Western	£14,832	£17,402	Dec.. £2,570	14.8

Week ending August 14:			
Grand Trunk	£36,000	£40,000	Dec.. £3,400	8.5

Lake Rates.

Shipments from Chicago to Buffalo were taken last week at 2 cents per bushel for corn, and 2¼ for wheat. This comes very nearly annihilating the distance between Chicago and Buffalo (which by lake is about 950 miles), and is only about equal to the elevator charges at the two places.

The Buffalo *Express* says: "Vessels, tugs and canal boats in large numbers are lying idle, anticipating better times. Two cents a bushel is reported as the rate on corn from Chicago to Buffalo, and vessels that get that even are deemed fortunate. If the bulk of vessels at Chicago, and we understand from Captain Bain, of the Onondaga, that there were counted there

last week 125 sail vessels, including many of the largest on the lakes, should seek to load at once, they could not get one cent per bushel on corn to Buffalo. There are no grain-laden sail vessels on the lakes to speak of. The Onondaga arrived Saturday night, and was the last from the straits. Here, the River Towing Association, under the management of Jones & Maytham, have laid up and placed in ordinary the greater portion of their tugs, leaving only three or four for active service. Of canal boats, the canal and slips are full of them. There are probably not less than 300 in port."

Ocean Freights.

Last week grain was taken by steam to Liverpool at 6¼ to 6¾ pence, and provisions at 30 shillings per ton. Rates have risen somewhat recently. The distance from New York to Liverpool is three times as far as that from Chicago to Buffalo, and the freight rate last week was seven times as great.

THE SCRAP HEAP.

Railroad Manufactures.

The Cleveland (O.) *Review* says: "The Cleveland Rolling Mill Company's works are running to their full capacity. The Newburg Mill is turning out steel rails to fill a contract with the Toledo, Wabash & Western road. Their Lake Shore mill is running on iron rails. The three rod mills and the plate mill are fully engaged. They have contracts some months ahead.

"The iron structure with which it is intended to replace the wooden building covering the Newburg works of the Cleveland Rolling Mill Company is in course of construction and will be completed within sixty days. This work will not cause any suspension of work in the mill."

The Neshannock Furnace, at Newcastle, Pa., has a contract to furnish 5,000 tons of Bessemer pig iron for the Pennsylvania Steel Works at Baldwin.

The Pittsburgh Locomotive & Car Works are just completing six standard engines with 16 by 24 cylinders for the Atlanta & Richmond Air Line road. They have also finished three narrow-gauge engines for Western roads. The latter are eight-wheeled "American" engines with 9×16 inch cylinders. The shops are running full time with about one-quarter of a full force.

The rail mill of the St. Albans Iron & Steel Works has stopped for the present, having no orders on hand.

Mr. T. P. Richardson, a well-known contractor, recently built for the Boston, Revere Beach & Lynn road over 6,200 feet of pile bridging in 60 days, in addition to a draw-bridge 125 feet long, with two piers. Since finishing this work Mr. Richardson has built 700 feet of pile bridge, including a draw, for the Warwick Railroad of Rhode Island. This last job was done in 17 days.

The Leetonia Tool Company, a new firm, has just erected works in Leetonia, O., for the manufacture of railroad and mining tools. The works contain two steam-hammers and other necessary machinery.

The La Porte (Ind.) Car Manufacturing Company has recently made arrangements for doing repair work to engines and cars.

British Rail Exports.

The Board of Trade returns for July gives the following figures for the exports of railroad iron of all kinds:

For the month of July:

	1875.	1874.	Inc. or Dec.	
Exports to United States	1,814	112	Inc. 1,702	1520
Total exports	71,601	77,897	Dec. 6,296	8

For the seven months ending with July:

	1875.	1874.	Decrease.	
Exports to United States	3,288	11,042	7,754	70
Total exports	330,905	505,164	174,259	34

More than half of the total shipments to the United States for the seven months were made in July, but these shipments were still light. For the seven months the average value per ton was £10 4s. in 1875, against £12 15s. in 1874, a decrease of just one-fifth. It has been assumed that the exports to the United States are now chiefly steel, but this can hardly be true this year, for the average valuation per ton exported to the United States has been less than the average valuation per ton exported to all countries and only £9 16s. 6d. Last year, doubtless, the exportations to this country were largely steel, the average valuation of such exports for the seven months having been £13 12s. The total exports to this country for the seven months would lay 37 miles of track with 56 lbs. rail.

The Swing Beam Truck Patent.

The Locomotive Engine Safety Truck Company calls our attention to the fact that in the notice under this head published last week, the name of the patentee of the swing truck was printed "Alba F. Sweet," instead of "Alba F. Smith," as it should have been. The correction is the more necessary as there is a Mr. Sweet, formerly Master Mechanic of the Michigan Central road, who had a patent locomotive truck, and the error in the name might thus lead to some confusion.

OLD AND NEW ROADS.

Erie.

On the 1st inst., the Erie Company began paying the interest of the second and third-mortgage bonds, due that day. The New York *Evening Post* says: "The principal and interest of $4,580,000 6 per cent. sterling bonds, due to-day, was not paid; these are not a mortgage, but were made convertible into first consolidated mortgage bonds, which latter rank after the old fifth mortgage, under which the Receiver holds his place."

Rome, Watertown & Ogdensburg.

It is reported that arrangements have been made by which the trains of the Lake Ontario Division will run over the tracks of the New York Central & Hudson River road from Lewiston, N. Y., to Niagara Falls, as soon as the line is completed to Lewiston.

The work on the grading and bridges of the Lake Ontario Division is progressing well, and the company expects to have the iron all down to Lewiston this fall.

Chicago & Michigan Lake Shore.

It is said that surveys are being made for an extension from the present terminus at New Buffalo, Mich., southward to the Lake Shore & Michigan Southern road near La Porte, Ind. The distance is about 15 miles.

Delaware & Bound Brook.

We are informed that the Ewing & Trenton Company, which recently filed the location of its road in New Jersey, and which, it was said, "was to form a branch of this road at Trenton," has no connection of any kind with the Delaware & Bound Brook Company, and the officers of that company have no knowledge whatever of its purposes or of the location of its road.

Atlantic & Great Western.

A list of the amounts of securities whose holders have assented to the revised scheme of arrangement is given down to July 21, since which time we have seen no statement of figures, though English journals say that assets were coming in rapidly and for large amounts. By the statement of July 21, $27,486,283 of securities of all classes, out of a total of nearly $100,000,000, had assented to the arrangement. These included more than a quarter of the first and third mortgage and more than a third of the second mortgage bonds.

Meetings.

The following companies will hold their annual meetings at the times and places given:

Cleveland and Mahoning Valley, adjourned, in Cleveland, O., September 11, at 11 a. m., in the company's office.

Indianapolis, Bloomington & Western, in Urbana, Ill., September 8.

Springfield, Western & Southeastern.

A company by this name has filed articles of incorporation in Missouri. The object of the company is to take the franchises and graded road of the old Kansas City & Memphis Company and complete the road. The new company has already made provisional contracts for ties and iron. A vote is to be taken soon in Barton County, Mo., on the question of subscribing $45,000 to the company.

The Vermont Central Trustees' Accounting.

The counsel for the bondholders have about completed their side of the case and have framed a formidable indictment against the trustees. The charges are, in brief, as follows:

1. That the trustees leased the Sullivan Railroad in their private capacity and operated it so that the net earnings were large. These net earnings they retained themselves, although the road was worked practically as part of the trust.

2. The Montreal & Vermont Junction road was mainly built and owned by two of the trustees, and was operated under an arrangement by which the trust paid all expenses and repairs and turned over 50 per cent. of the gross earnings to the owners.

3. That W. C. Smith, one of the trustees, received from the St. Albans Foundry Company a royalty of one-half cent per pound on castings and of over $2 each for car wheels furnished the trust, and that the prices paid were above market rates.

4. That about $30,000 was spent for "secret service," and that details of the expenditure are refused.

5. That funds of the trust were used in the unauthorized purchase of the Stanstead, Shefford & Chambly road in Canada.

6. That money due for carrying Canadian mails was illegally drawn by Col. A. B. Foster, who was associated with the trustees in the ownership of the Montreal & Vermont Junction road.

7. That the National Car Company and the Vermont Iron & Car Company were organized for the purpose of making money out of the trust.

8. That the trustees threw upon the trust losses of $75,000 from the construction of the Missisquoi road, of nearly $832,000 from the Rutland lease, and $409,000 from the Ogdensburg & Lake Champlain lease, besides $250,000 lost in running the lake boats.

9. That funds of the trust were unlawfully used in buying stock in the Northern Transportation Company and in hotel and other companies.

10. That the trustees have been in the habit of retaining lawyers all over the State and of paying large retainers for nominal services, and that free passes have been largely used and given to lawyers, members of the Legislature, editors and others.

11. That expenses were incurred in lobbying at Montpelier, Concord, Albany and Washington, and funds were used with the probable intent of corrupting public officers.

The defense is not yet fully developed, but the main arguments apparently are a claim that the various leases and purchases were essential to the preservation and development of the trust; a general denial of fraudulent practise or intent, and finally what lawyers would call a plea of *autrefois acquit*, a claim that the periodical auditing of the trust accounts by a committee of bondholders and their approval by that committee is a bar to any exceptions now taken.

The hearing is still in progress and will apparently last some time longer.

Pennsylvania.

Surveys are being made for a new freight track around the city of Lancaster, Pa., over which trains can pass instead of going through the city. The new line will leave the present track at the Big Conestoga Bridge and run by way of Stambaugh's and the Little Conestoga to Dillersville, several miles.

An engine-house and other buildings are to be erected in Gaysport, Pa., on the Hollidaysburg Branch.

The extension of the Moshannon Branch of the Tyrone Division is progressing well, and two miles of track have been laid, carrying the track to the Kendrick coal shaft and within a mile of the summit. The whole length of the extension from Houtzdale to Madera will be seven miles.

The banking firms of Drexel & Co., C. & H. Borie and W. H. Newbold's Son & Co., in Philadelphia, are offering for sale this company's new 6 per cent. sinking-fund bonds, payable in 1905. The bonds are either registered or coupon, interest on the former being payable quarterly and on the latter half-yearly. The price is 96 and accrued interest; the amount offered is not stated. The company authorizes the statement that the present issue is for the purpose of paying for all construction and equipment work done and to be done during the year 1875, and for paying off the entire floating debt of the company.

Washington & Ohio.

The proposed agreement between this company and the parties represented by Mr. O. A. Stevens has not been carried into effect. At the late general meeting of stockholders certain amendments were made to the original contract, which, at a meeting of the board of directors, held in Alexandria recently, were under consideration, but the parties being unable to agree in regard to the alterations, the board declined to take any further action at present.

Sharon.

This road is to run from Sharon, Pa., northward to the Atlantic & Great Western, at Cape Horn, a distance of about eight miles. For about a mile, to Rowle's Furnace, a track is already in existence and will be used. A contract for the grading of the seven miles from Rawle's Furnace to Cape Horn has been let to Scurry & McCray, of Greenville, Pa., who are to begin work at once and complete it by December 1. The work will be light, as for much of the distance the line follows the tow path of the abandoned canal.

Central, of Iowa.

Judge Love, of the United States Circuit Court, has, according to the Iowa papers, decided that the machine shops must be moved from Eldora to Marshalltown within six months, provided Marshalltown pays the expenses of removal.

Vicksburg & Meridian.

The President some time since issued a circular stating that the company was unable to pay the 2 per cent. interest due April 1 on the unindorsed bonds, and that this failure was caused by the excessive taxation imposed upon the road by the towns and counties along the line, the taxes amounting to about $30,000. Previous to this the company had been almost entirely exempt from taxation by the terms of its charter. The circular says:

"It is doubtless known to you that by reason of the great flood of April, 1874, and the destruction of the Big Black Bridge and the consequent extra expenses and loss of business, the company was compelled to pass the 2 per cent. interest due the 1st of July last, upon the *first*, *second* and *third* mortgage bonds; and that the company has not until now defaulted upon the interest of the *unindorsed* bonds. I am glad to be able to state that the present Legislature has passed an act which establishes the total taxation of the company at about $11,000 per annum, payable to the State, and which is to be in place and in lieu of all other taxes, State, county and municipal. With this amount of taxation, the managers of the company believe that they can, after the 1st of April, pay the customary 2 per cent. of interest upon the 1st of July and October, and regularly thereafter."

Toledo, Ann Arbor & Northern.

The partly graded road-bed of this road will be sold at auction in Ann Arbor, Mich., September 14, by the assignee in bankruptcy.

Missouri, Kansas & Texas.

The Receiver, Mr. Wm. Bond, has issued the following circular:

"The office of general manager of the Missouri, Kansas & Texas Railway, made vacant by the resignation of Col. R. S. Stevens, is hereby abolished."

The Receiver reports as follows for the half-year ending June 30:

	1873–74.	1872–73.	Inc. or Dec.	P. c.
Receipts from freight	$769,965 69	.....	.....	....
Passengers	352,444 58	.....	.....	....
Mails	71,112 00	.....	.....	....
Express	34,875 00	.....	.....	....
Miscellaneous	4,706 12	.....	.....	....
Tot'l receipts	$1,233,103 29	$1,444,989 94	Dec. $211,886 55	14.7
Expenses:				
Transportation	189,995 92	.....	.....	....
Locomotive expenses	186,001 97	.....	.....	....
Car expenses	65,423 86	.....	.....	....
Maintenance of way	122,300 09	.....	.....	....
General expenses	35,928 37	.....	.....	....
Other expenses	1,729 45	.....	.....	....
Work'g expenses	$601,379 66	.....	.....	....
Construction account	84,644 19	.....	.....	....
Total	$686,023 82	$975,520 80	Dec. $289,496 98	29.7
Net earnings	$547,079 57	$469,469 14	Inc. $77,610 43	16.5

The earnings per mile were $1,560 in 1875 and $1,838 in 1874. The proportion of working expenses was 49.58 per cent.; including construction it was 55.63 per cent. in 1875, and 67.51 per cent. 1874. The net earnings were $696 per mile worked in 1875, and $597 in 1874.

Utica & Black River.

Track laying is in progress on the extension from Redwood, N. Y., to Morristown, and the company expects to have it completed by December.

Keokuk & Des Moines.

The grading of the new river route from Buena Vista to Sand Prairie, is now well advanced, and the contractor has begun to lay iron at Buena Vista. The work has been much delayed by heavy rains.

Wisconsin Central.

In the suit of Governor Reid against this company and George T. Bigelow and John A. Stewart, trustees, the Milwaukee Circuit Court has granted an injunction to restrain the company from disposing of the remainder of its first-mortgage bonds.

This company has issued a circular which gives the following statement:

Received from sales of $4,618,500 first-mortgage bonds	$3,712,919.39
Preferred stock	1,900,100.00
Town and county bonds	115,627.50
Three years' notes	167,000.00
Borrowed money	38,795.58
Total	$5,934,462.47
Paid for construction	$5,238,715.94
Interest	534,780.77
Sundry accounts	159,812.92
	5,933,309.63
Balance	$1,152.84

Including 120 miles of leased road there are 320 miles over which trains are run. The land grant expires December 31, 1876, by which time about 125 miles more of road must be built or the balance of the grant, 400,000 acres, will be forfeited. The company proposes to fund nine semi-annual coupons in an interest-bearing certificate, and to issue more bonds to complete the road.

A second circular proposes to issue $2,500,000 bonds at 80, and deposit five years' interest in a New York trust company, or to deduct the five years' interest from the money paid for the bonds. This arrangement would make the receipts from a $1,000 bond about $460. This would give about $1,150,000 to build the 125 miles of new road, as the net earnings of the completed road are all needed for new equipment and improvements.

The sections to be finished are from Worcester, Wis., north to the Penoka iron range, and from Stevens Point southward to Portage.

It is probably in consequence of the issue of these circulars that the injunction mentioned above has been applied for.

New Castle & Shelbyville.

It is proposed to build a railroad from New Castle, Ind., southwest to Shelbyville. The distance is about 35 miles, and for about 20 miles there is an old grade in existence.

Montclair.

The Superintendent, Mr. T. C. Purdy, gives notice that, immediately after the burning of the bridge over the Passaic at Woodside, N. J., he took measures to build a temporary bridge. He found, however, that a temporary trestle would obstruct navigation, and would not be allowed unless the rebuilding of the draw-pier and draw was in progress, with the utmost possible dispatch. With the funds at his command he was unable to pay for a permanent draw, and both the trustees who are in possession of the road and the bondholders' committee declined to become responsible for anything. He has therefore been obliged to abandon the hope of rebuilding the bridge and will run the road as best he can, making the transfer across the river with as little inconvenience to passengers as possible. It is not likely that anything further will be done until after the foreclosure sale, which is to take place for September.

Gilman, Clinton & Springfield.

Under the recent order of the Court, Mr. Hinckley, the former Receiver, turned over the road Aug. 28 to Mr. Charles S. Seyton, who is agent for the trustees under the first mortgage, Thomas A. Scott and Hugh J. Jewett. Mr. Seyton took formal possession and has established his headquarters at Springfield, Ill.

Mr. Hinckley, while surrendering possession of the road and a part of the money in his possession, retained the larger share of the cash balance, amounting to over $40,000. His reasons for this action are that he is liable for debts accrued under his receivership and upon a bond which he had given, and upon which an injunction had been issued by the United

States Court restraining the collection of taxes levied by the State upon its capital stock. Mr. Seyton offered to give him sufficient security to cover all his liabilities, and will bring the question before the Court as soon as possible.

Fort Scott, Southeastern & Memphis.

This company has filed articles of incorporation in Missouri. The capital stock is to be $1,700,000. The route is about 170 miles long, from the point where the Kansas road of the same name reaches the Missouri State line southeast to the Arkansas line in Ozark County. At the latter point it is to meet a line to be built from Memphis, Tenn., up through Arkansas.

Vicksburg, Shreveport & Texas.

Messrs. Ludeling, Ray and the other parties who composed the North Louisiana & Texas Company, whose claim to the road was decided to be illegal by the United States Supreme Court, have filed in court a claim for about $900,000 for improvements which they claim to have made in the road while it was in their possession. The old bondholders who now hold the title to the property, charge that this bill is fraudulent, amounting to about $10,000 per mile, while in fact no such improvements were made.

New York & New England.

An officer of the company has made the following statement which is not new, but which sums up the present condition o affairs:

"The corporation was organized in April, 1873, but did not come into possession of their property till July, 1875, as it was necessary to pay certain debts amounting to $750,000, incurred while the receivers and trustees were in possession. This amount was raised by the issue of the company's notes, dated Sept. 1, 1874, payable two years from date, with 7 per cent. interest, semi-annually. The first coupon on these notes was paid last March, and the second becomes due on the 1st of September next. The capital stock of the new company is limited to $20,000,000, being the amount of bonds issued under the Berdell mortgage. These bonds are for $1,000 each, and entitle the holder to ten shares of the new stock. Up to Aug. 24 there had been exchanged between five and six millions of bonds. There is no time fixed by the mortgage within which holders must convert, but the bonds are no longer a lien upon the property, and are of no other value than as representing so much stock, or rather entitling the holder to exchange for stock, as a bondholder has no rights as a stockholder until he converts his bonds. The property is further encumbered by about $2,500,000 bonds secured by mortgages prior to the Berdell mortgage."

The formal announcement of the transfer of the property by the trustees was made July 31.

Michigan Central.

This company's contract with the Pullman Palace Car Company for running sleeping cars over its road expires this fall. The New York Central objects to hauling Pullman cars, and when a new contract is made it is reported it will provide that all sleeping cars running east of Suspension Bridge and over the New York Central shall be Wagner cars, while all which pass over the Erie and Michigan Central shall be Pullman cars. Then, apparently, no Pullman cars will run on the New York Central, and if one sleeping company gives better accommodations than the other, it will attract travel not only to that company, but to the road over which its cars will run exclusively.

The Detroit *Tribune* says: "A few days since the *Tribune* announced a conference of railroad officials relative to a proposition to substitute Wagner for Pullman cars on the Central Railroad. It is now authoritatively stated that the change has been ordered to take effect on and after the first of November. Mr. Pullman's contract with the Central expires on the first of October, but the use of his cars will be continued thirty days beyond this time by mutual consent. This change, it is believed, will not have any effect upon the manufacture of Pullman coaches in Detroit, as the works here are wholly engaged in repairing and in constructing new cars for Europe."

This probably is a mistaken account of the decision, as the Erie has no Wagner cars and the Michigan Central certainly does not prefer them.

Reports have been circulated to the effect that this company was about to enter into an agreement with the Canada Southern, by which a large part of its through business was to be sent over that road. These rumors have, however, been contradicted.

Western North Carolina.

Governor Brogden of North Carolina has appointed three commissioners, who, with one chosen by the private stockholders, will have the charge and management of this road under the law passed by the last Legislature. The road was purchased by the State at the recent judicial sale.

Toronto, Grey & Bruce.

This company is said to be financially embarrassed and unable to meet current demands for wages and other purposes. The employes have threatened to strike unless they are paid. The board offered to make a partial payment, but this was rejected.

Elizabeth, Lexington & Big Sandy.

It will be remembered that some months since the Legislature of Virginia authorized the city of Richmond to subscribe $1,000,000 to aid the building of a road to connect the Chesapeake & Ohio with the Western system of railroads. It is understood that negotiations have been in progress to secure this subscription for the Big Sandy road to Louisville. The proposition said to have been made is that a new company be formed, to which the present owners are to turn over all the property, the completed road, grading, etc., and to subscribe $500,000; they are also to build the bridge over the Big Sandy River, and the nine miles of road from that point to Huntington. The Richmond subscription of $1,000,000 will then be given to this new company. It appears to be doubtful whether all parties can be brought to accept these terms.

The City Council of Lexington, Ky., has appointed a committee to see whether the towns and counties holding stock in the company can be brought to agree upon any plan for the completion of the road.

Waynesburg & Washington.

The contract for 65,000 ties has been let to J. B. Poor, of Pittsburgh, at 18½ cents per tie. The delivery is to begin September 10, and 900 per day are to be furnished until the contract is filled. The work of getting out timber for the bridges and trestles is in progress. The heaviest cuttings on the line are now finished, and the rest of the grading is well advanced. There is talk now of an extension south of Waynesburg, either up Smith Creek to Blacksville, or down Muddy Creek to Carmichael's. Either line is practicable and would, it is said, secure a good local traffic.

Parker & Karns City.

This company has agreed to build an extension from Parker City, Pa., north by east to Petersburg, in Clarion County, about five miles, provided the parties interested will buy $50,000 of the company's first-mortgage bonds.

Cincinnati Southern.

In addition to the 11 miles already completed from Lexington to Nicholasville (the old Cincinnati, Lexington & East Tennessee road), about 41 miles of grading have been accepted, and 50 miles more are nearly ready. About 200 miles of grading will be completed by November. Several sections which were abandoned by the contractors are yet to be re-let. Contracts have been made for the ties for a considerable part of the line.

The Delaware Fruit Traffic.

The direct peach train run from Middletown, Del., to Boston has proved very successful, the fruit arriving in good condition. There is a saving of several hours over shipments made to New York and then reshipped, and the peaches are saved from an extra handling, which is thought to damage them as much as a 12 hours' longer journey.

The shipments made to the West have not done so well, much of the fruit arriving in a damaged or spoiled condition, while the prices brought by that which was good were not high enough to warrant the payment of the freights charged. It is said, however, that little or no first-class fruit has been sent to Western cities.

Atchison, Topeka & Santa Fe.

The first train over the newly acquired branch to Kansas City was to run August 30. The extension westward to Las Animas, Col., is nearly completed, and trains will be running in a short time.

Spanish Fork.

Work has been begun on the grading of a new narrow-gauge road which is to run from the Utah Southern through the Spanish Fork Canon into the Sanpete Valley.

St. Louis, Iron Mountain & Southern.

A movement is on foot to build a direct line from Shreveport, La., northward to this road near Fulton, Ark. The distance is about 80 miles. A committee was to be sent to St. Louis to confer with the officers of the company.

European & North American.

The stockholders met in Bangor, Me., last week, but adjourned for thirty days without taking any action. The committee for the creditors have prepared their report, and will present it at an early day.

Western Maryland.

The work of demolishing the old buildings now on the ground to be occupied by the new depot in Baltimore is in progress. The contracts for the construction of the building will be concluded by the time the ground is cleared.

Pinconning & Glencoe.

The Detroit *Tribune* says: "An iron railway eleven miles long has been built by Van Etten, Campbell & Co., from Pinconning, on the Jackson, Lansing & Saginaw Railroad, to their mills at Glencoe, on the head waters of the Kawkawlin River."

The same firm built a wooden road on apparently the same line about two years ago. They have now probably put down iron rails on the old wooden road.

Davenport & St. Paul.

The officers of this company and the agent of the bondholders have been inspecting the various lines proposed to bring this road into the city of Davenport, Ia., and have been consulting with a committee of citizens as to the steps to be taken to secure the building of this extension into the city.

Canada Southern.

The business of this road is reported to be increasing steadily and even rapidly. Negotiations are said to be in progress for important connections with other lines.

Transportation to the Centennial.

In a communication to Mr. A. T. Goshorn, Director General, Mr. Cassatt, Third Vice-President of the Pennsylvania Railroad Company, says that that corporation has received responses from the New York Central, the Erie and the Baltimore & Ohio railroad companies, assenting to the proposed arrangement with reference to the transportation of goods to and from the Centennial Exposition. He says:

"It is, therefore, understood that regular rates shall be charged on all goods carried to the Exposition for exhibitors over the roads controlled by the above-named companies and by this company, and that all unsold goods shall be returned free—freight and all charges to be prepaid in every case. This arrangement to cover all articles intended for exhibition, as well as all other articles forwarded by exhibitors for their own use in connection with the Exposition."

Cleveland, Columbus, Cincinnati & Indianapolis.

The contract for the brickwork of the new repair shops at Brightwood, near Indianapolis, has been let to Harry Taylor & Co., work to be completed by October 1, 1876. There are to be seven separate buildings, and the estimated cost is $130,000.

Indianapolis, Bloomington & Western.

During the eight months from December 1, 1874, to August 1, 1875, Receiver Wright has expended $242,612.96 for iron and steel rails and fastenings and new ties. At the latter date there were contracts amounting to $226,642.54 outstanding for material for track repairs, all of which was to be delivered within 90 days.

New York & Long Branch.

There is talk of an extension from Squan Village, the end of the extension now in progress, southward along the shore through Toms River, Barnegat and Mannahawken, which probably rests on no very solid foundation as yet.

Tennessee Railroad Taxation.

The State Assessors have assessed the 45 miles of the Louisville & Nashville Railroad in Tennessee at $18,000 per mile. Their action awaits the approval of the Governor, who is understood to have expressed his approbation verbally.

A letter has been received from Mr. Russell Houston, attorney for the road, in which he intimates to the Commissioners that if they determine to assess the branches of the road the company will carry the matter into the courts and there contest the right of the State to assess them, claiming that they are exempt from taxation under the provisions of their charters granted by the Legislature of Tennessee.

Hempstead & Montgomery.

This company was organized in Hempstead, Tex., August 14, and purposes beginning work as soon as the necessary subscriptions can be secured. The road is to run from the Houston & Texas Central at Hempstead northeast about 30 miles to Montgomery, and it is proposed to build it on the prismoidal, or one-rail system.

Northern Pacific.

At the time of the recent accident to the Brainerd Bridge, General Manager Mead expressed to a reporter of the St. Paul *Pioneer-Press* his belief that it had been caused by the dropping of a brake-beam from one of the foreign cars which were on the train and which had brake fastenings of a different pattern from those of the Northern Pacific cars. On August 21 another accident happened at the bridge, which the same paper describes as follows:

"As the train in question was crossing the new bridge, the brake of one of the cars dropped, catching a tie, and before the train could be stopped had torn out the ties for a distance of ten or twelve feet. The new bridge being of the pile pattern, and much stronger than any ordinary truss bridge, withstood the shock, and a repetition of the terrible calamity of a few weeks ago was averted. The last accident goes far to corroborate the expressed theory of Gen. Mead, the plausibility of which was concurred in by the experts who examined the wreck, and who were unanimously of opinion that an accident of some nature, directly to the train, was the cause of the disaster."

Northern Central.

The new roof on the Baltimore depot is completed, and further improvements are talked of. The new building for the general officers in Baltimore is being pushed forward, and the walls of the foundation and basement story are up.

The road is securing a considerable share of the fruit business from Baltimore to the West, taking the great bulk of all that sent by ordinary freight trains. The fruit growers claim that sufficient concessions have not been made in the rates on fast freight shipments, in view of the past business they have given to the Baltimore & Ohio. It is said that the Northern Central was willing to reduce rates, but the Baltimore & Ohio would not consent.

Alabama & Chatanooga.

From the evidence taken before the special commissioner it appears that the receivers' certificates will amount to a little more than $1,000,000, of which about $371,000 were sold at 90 per cent. of their face, $245,000 were issued for lands at Chattanooga, and about $400,000 were for loans made by the receivers with interest to September 1. Of these loans about $250,000 were made in New York at a high rate of interest, and might be contested, though they have been allowed by the court. In addition there is about $77,000 to be paid for wages due, and $200,000 for court expenses. It is said that there is about $125,000 owing for small debts, which will have to be paid in money. Mr. J. C. Stanton holds a judgment of $340,000, obtained in a Tennessee court, which, however, may possibly be rejected. Including everything the debts amount to about $1,750,000.

An offer has been made by Boston parties to purchase the road, and it is said that the foreign bondholders have sent over a special agent to negotiate with those parties.

New Jersey & New York.

Proceedings have been begun in the Court of Chancery to compel the Erie to specific performance of contract. The company claims that the Erie has no right to use the method of enforcing the payment of rent which it has adopted, its proper remedy being in a suit for debt.

In addition to the line from Hackensack Junction to Jersey City, the company uses some two miles of the Piermont Branch of the Erie, from Spring Valley, N. Y., to Nanuet Junction. The Erie has made no attempt to interfere with the connections over this section of road.

A question of some importance will be involved in the suit before the Chancellor, and that is whether a railroad company has a right to take such violent action as the Erie has to enforce a contract, and thereby interrupt or stop altogether public travel. Some time ago, when the Erie attempted to prevent the Delaware, Lackawanna & Western from passing through the Bergen Tunnel, the Governor of New Jersey took the ground that the rights and convenience of the public must override all minor considerations, and that travel could not be stopped in this way. He therefore took possession of the tunnel and allowed the trains of both parties to pass through. In that case the companies settled their differences by a compromise, and the Governor's action was never passed upon by the courts.

New Jersey Railroad Taxation.

It will be remembered that the Morris & Essex Railroad Company refused to pay taxes levied under the present law, on the ground that the amendment to the charter passed in 1865, which provided for the payment to the State of an annual tax of one-half of one per cent. on the cost of the road, constituted a contract between the State and the company and consequently could not be set aside. The Court of Errors and Appeals, the highest Court in the State, however, decided against the company, holding that the law of 1865 did not constitute a contract and that it could be repealed or amended by the Legislature. From this decision the company has now appealed to the Supreme Court of the United States. Preliminary injunctions have been issued prohibiting the collection of the taxes levied upon the company until the case can be heard and decided.

Northern Pacific.

The United States Circuit Court has confirmed the sale of the road and its purchase by the bondholders' committee. There is now no reason for further delay in the reorganization of the company.

The Purchasing Committee of bondholders has issued a call for a meeting of all bondholders who have concurred in the plan of reorganization and surrendered their bonds to meet at the office of the company, No. 23 Fifth avenue, New York, September 29, at at 12 noon, for the purpose of electing a board of directors and transacting any other business that may come up.

Holders of receipts of the Farmers' Loan and Trust Company of New York for surrendered bonds will, *on production of such receipts*, be entitled to vote in person or by proxy at said meeting, and until formal certificates of preferred stock are issued.

Holders of common stock have not the right to vote till on and after July 1, 1878.

Springfield & New London.

The line from the water shops to the junction with the Springfield, Athol & Northeastern road in Springfield has been finally located. The contract for the grading has been let to Sackett & Reynolds, of Springfield.

Old Colony.

The fifth span of the Fall River Bridge is nearly ready, and work on the bridge is being pushed with the intention of having it completed before winter. It is said that next spring a track will be laid from Somerset down the west side of the river to the new bridge, and that the old wooden bridge over the Taunton River at Somerset will be abandoned.

New Mail Routes.

The following order for extensions of service have been issued by Mr. George S. Bangs, General Superintendent of Railway Mail Service.

Portland & Ogdensburg.—Extend from Bartlett by Crawford House to Fabyan House, 18½ miles, from Sept. 1.

Dividends.

Dividends have been declared by the following companies:

Lehigh Coal & Navigation, 2 per cent., quarterly, payable September 4.

Nesquehoning Valley, 5 per cent., semi-annual, payable September 4.

New Bedford & Middleboro.

The people of New Bedford, Mass., at a special election last week voted against subscribing $200,000 to a proposed line from that city northward to the Old Colony at Middleboro, a distance of about 17 miles. Another election can and probably will be held.

Woodland & Colusa.

The right of way has been secured, the line finally located, and the contractors were to begin work this week. A large force is to be put on at once.

Susanville & Reno.

It is proposed to build a railroad from Susanville, Cal., to Willow Creek, 15 miles, and thence by way of Long Valley to the Central Pacific at Reno. Another route spoken of is by way of

Pyramid Lake and Truckee Meadows, striking the Central Pacific near Wadsworth. Both lines are said to be feasible with moderate grades. It is also proposed to build from Susanville in the other direction by way of Big Meadows and Deer Creek Canon to the Sacramento Valley near Chico, about 90 miles. The projected line or lines would open a heavily timbered and fertile country, and it is thought that a large lumber business could be developed, as the road could be connected by flumes with Eagle Lake and other lakes and streams in the district.

Southern Pacific.

Work on the extension of the Anaheim Branch southward to Tustin has been begun. A bridge over the Santa Ana River is to be built, which will be a highway as well as a railroad bridge, the county contributing $20,000 towards its cost. An examination is being made of the country southward, the object being to extend this branch ultimately to San Diego.

It is said that a number of the Chinese employed on the grading in the Cabezon Valley, near the Colorado Desert, have died from the intense heat. It is a common thing there for the thermometer to mark 120° in the shade, if any shade can be found, but the air is so perfectly dry that its effect is less serious than might be supposed.

Northern Colonization.

The Toronto *Monetary Times* says: "The Northern Colonization Railway sent a deputation to Quebec last week to solicit the Local Government to complete the work. Ministers promised their 'consideration,' and have since, it is said, agreed to carry on the project. There is no question that the suspension of operations along the line occasions embarrassment to numerous store-keepers and others who have furnished supplies, and are obliged to wait for their pay. It is also stated that the Quebec Government will continue the works upon the North Shore road as far as Three Rivers."

Atlantic & Pacific Telegraph.

It is reported that the negotiations between this company and the Western Union have resulted in an agreement to lease all the Atlantic & Pacific lines to the latter company. It is said that the Atlantic & Pacific property is to be taken at a valuation of $2,500,000, and that the Western Union agrees to pay on that amount the same dividends as it pays upon its own stock from time to time. For a year past these have been 2 per cent. quarterly.

Los Angeles & Independence.

The rumors that this company was about to sell out to the Southern Pacific have been contradicted by authority. Work is being actively pushed between Los Angeles and the new port of Santa Monica, and tracklaying has been begun.

It is said that the line originally surveyed will be given up, and that a detour will be made by way of Chino and Riverside to San Bernardino, provided aid can be obtained from San Bernardino County. There is a much better country on the proposed new line than on the original one.

St. Louis & Memphis.

This company desires to negotiate for the grading and bridging of its line ready for the iron, or for its full completion and equipment. The line of the road is from Hopefield, Ark., opposite Memphis, on the Mississippi, north by west to a connection with the St. Louis, Iron Mountain & Southern. Its length is about 80 miles. At the northwestern end 21 miles are under contract and work progressing.

The grading is light, being mostly light embankment, and but little excavation or cuttings. Tie and bridge timber is very abundant on the line of the road. The company owns 1,100,000 acres of land and $200,000 in county bonds. Further information can be had from Mr. Walter S. Hawkes, Chief Engineer, whose address is Minturn, Lawrence County, Arkansas.

New Orleans Pacific.

A contract for grading and clearing the road from Alexandria, in Rapides Parish, La., to Mansfield, in De Soto Parish, has been awarded to Maj. S. L. James, who is to put 300 men to work at once. Subscribers to the stock in the parishes of Nachitoches, Rapides and De Soto are to have the option of paying their subscriptions in money or in labor at rates to be fixed by agreement between the company and the contractor. Under this arrangement the company has the right to increase the working force to 1,000 men at any time, the contractor providing the necessary supplies. The progress of the work will depend entirely upon the subscriptions. The line beyond Mansfield has not yet been decided on.

Delaware & Hudson Canal.

This company has reduced the running hours on the canal from 20 to 12 hours, and has cut down the number of employes on the canal one-half. The coal depots are full of coal for which there is no present sale, which is the reason for the reductions. It must be remembered that the closing of the Schuylkill mines so long by the strike gave this route an unnaturally heavy business early in the season.

Washington & Chesapeake.

It is proposed to build a narrow-gauge road from Washington eastward to Fair Haven on the Chesapeake Bay, a distance of about 25 miles. Fair Haven is becoming quite a summer resort. The road would pass through a purely agricultural and not very thickly peopled country, but it is thought that a suburban business might be developed in time.

Boston & Albany.

In consequence of decreased business and low rates, the directors have voted to reduce the salaries and wages of all officers and employes of the company, no matter what their position, 10 per cent. from September 1.

Port Dover & Lake Huron.

The building of this road is being pushed forward rapidly. The rails are being distributed along the section between Tavistock, Ont., and Stratford. A large force is at work on the grading about East Zorra.

North Shore, of Canada.

The Quebec City Council has ordered that no further payments be made on account of the city subscriptions of $1,000,000 to this road, in view of the company's admitted inability to proceed with the work. A memorial was also adopted requesting the Provincial Government to take steps to complete the road. In that case the city subscription will be paid over to the Government, on condition that it is not called for until the road is completed from Quebec to Montreal.

Rockford, Rock Island & St. Louis.

The proposition made to the German bondholders by the new organization which proposes to take the road is reported to be pretty much as follows:

The new company is to pay $600,000 in cash, which is to be raised by a preferred mortgage of $640,000, payable one-half in one year, the rest in two years. Another mortgage is to be executed, under which $2,000,000 of 6 per cent. bonds, having 20 years to run, will be issued, to be divided among the present bondholders as they may direct. These bonds are to be convertible into stock. Stock to the amount of $1,000,000 to be issued, subscriptions to be payable in 10 per cent. installments, and the proceeds to be used for putting the road into good condition and buying equipment.

This may or may not be correct; the proposition actually made was not to be made public until it had been submitted to the bondholders.

Mr. Osterberg, the agent who purchased the road for the German bondholders, says that 216 of the company's bonds held in America were owned by Americans, whose agent was Mr. C. W. Hassler, 200 were in care of a Chicago law firm, about 100 with the Union Trust Company (the trustees of the bondholders), and about 100 joined with the German committee, making about $600,000 held in this country. Mr. Osterberg says that holders who did not join in the purchase will get about 11 per cent. of the face of the bonds in cash for those of the first series (1 to 5,000), and 6¼ per cent. for those of the second series.

We understand that Mr. Osterberg's committee has about $5,500,000 of the bonds, about equally divided between the two issues. This would leave about $3,500,000 which will have to be paid their share of the proceeds of the sale—half, if Mr. Osterberg is right, 11 per cent., and half 6¼ per cent., or 8¾ per cent. on the whole, amounting to $301,250. A considerable part of the $1,320,000 bid will go to pay expenses which are a prior lien to the mortgage bonds.

Columbus & Toledo.

This company has called in three installments of 10 per cent. each on all subscriptions to the stock. They are payable respectively September 15, October 15 and November 15.

Work has been begun at two places by sub-contractors. The final locating party is now at work near Carey, O. The length of the road as surveyed is 121.7 miles.

Scioto Valley.

This company is advertising for proposals for ties, to be used in the construction of the road. The ties are to be eight feet long, not less than six inches thick and seven inches face, of oak, elm or walnut. They must be delivered along the line and will be paid for monthly, 15 per cent. being retained until the completion of the contract. Proposals must be addressed to George D. Chapman, General Manager, at Columbus, O.

Paducah & Memphis.

It is said that the creditors have agreed to give the company time in which to arrange its affairs, and that the suits against it will not be pressed for the present. The managers expect to be able to raise money enough to settle the claims of the bondholders.

Cincinnati Southern.

The work from Lexington to the Kentucky River is progressing steadily, and the grading of that section is nearly done. At the river, rock for the bridge piers is being quarried and other preparations made. There will be three piers, which will extend from the bed rock to a little above high water mark, and on them the iron towers, which are to carry the bridge trusses, will be placed. The track level of the bridge will be 275 feet above the bottom of the river.

St. Francis & Megantic International.

This road is now completed and in operation from the Grand Trunk at Sherbrooke, P. Q., eastward to Bury, about 25 miles. Work is still in progress. The road is intended to run nearly due east across Maine to New Brunswick and eventually to Halifax, N. S., by a connection with the Intercolonial.

Bangor & Calais Shore Line.

The towns of Jonesborough, Franklin, Columbia and Ellsworth, Me., have all voted in favor of extending aid to this projected road. In some cases these are renewals of former votes which have lapsed.

Woodstock.

The high bridge over Quechee Gulf, the most difficult work on the road, is completed, and trains have crossed it. It is 169 feet above the water and is said to be the highest railroad bridge in New England. There is now no obstacle to the completion of the road, and the work will proceed rapidly.

Pennsylvania—New York Division.

The work on the last span of the new bridge over the Delaware at Trenton is now in progress and will soon be completed. The grade of the road on the east side of the river is to be raised for some distance, which has caused considerable complaint and opposition among the parties owning real estate in that part of Trenton.

The company, indeed, has business on hand with several of the cities along the line. In Jersey City the City Council is urging the necessity of raising the tracks through that city above the level of the streets, and several conferences have been held between officers of the city and the company, but thus far without any definite result. In Newark the company is to be required to fence its tracks, erect gates at all the street crossings, and remove several sidings which are now laid alongside of the main track nearly all the way through the city. There is also talk of elevating the tracks, but there is very little probability that it will be done. In Elizabeth the difficult question, how to do away with the grade crossing of the Central Railroad and of Broad street is apparently no nearer an answer than it was several years ago. There, however, the street crossing, though an element in the problem, is a minor one, the main thing being to avoid the railroad crossing, which is an incessant cause of trouble and annoyance to both roads.

The trouble in Trenton has been settled by a compromise the company agreeing to pay damages to property-owners who are injured by the raising of the grade, and to conform the grade to an ordinance passed by the City Council. All objection on the part of the city has accordingly been withdrawn and connection has been made with the new tracks and the bridge.

Mexican Railway.

The new branch commencing at Tejeria, 9¼ miles from Vera Cruz, and extending northwestward to Jalapa, 62¼ miles, was opened to the public on the 15th of June. There are now six lines of steamers running regularly between the port of Vera Cruz and England, France and the United States.

Panama.

At a meeting of the directors in New York, August 25, the President was authorized to execute a new contract with the Pacific Mail Steamship Company, and also to extend the loan of $500,000 to that company, made two years ago, for another year.

Manchester & Keene.

A preliminary survey is being made of the line. A proposition has been received for the construction of the whole line, but the requisite amount of stock has not yet been subscribed to warrant the commencement of operations.

Central, of New Jersey.

On the extension of the Long Branch Division southward along the sea shore the track is laid to Ocean Grove, N. J., five miles south from Long Branch. This extension will bring a considerable addition to the passenger traffic, as there is at Ocean Grove a camp-meeting ground and summer resort, to which there is a very large travel at this season. This extension is built by the recently organized Long Branch & Sea Girt Company, which, however, is only another name for the Central, all the incorporators being officers of the Central or of the New York & Long Branch Company.

Delaware, Lackawanna & Western—Morris & Essex Division.

The construction of the new bridge over the Passaic at Newark appears not to have been finally decided on, and it is possible that there may yet be some change in the location. In this connection the Newark City Council has appointed a committee to confer with the officers of the company as to the possibility of altering the road so that it will cross Broad street in that city above grade, a very desirable improvement, as the present grade crossing of that street, on which there is a large travel, is a source of trouble both to the railroad and the city. The officers of the company have agreed to have the necessary plans prepared, and it is possible that the change may be made. On the west side of the river there is no obstacle, and, indeed, the road would be benefited by the cutting down of the very heavy grade between Newark and Roseville, but the increased elevation at the river would render a very heavy fill necessary on the east side of the bridge.

Chicago & Paducah.

Work has been begun on the grading of a branch line which is to extend from this road at Shumway, Ill., southward to the Vandalia Line at Effingham, a distance of about seven miles. The object of the branch is to secure a direct eastern connection over the Vandalia, which the main line now reaches at Altamont, the terminus, 10 miles southwest from Shumway.

Southern Maryland.

The Equity Court of the District of Columbia, on application of the creditors, has appointed N. F. Cleary Receiver of all property of the company within the jurisdiction of the Court. Receivers had previously been appointed in Maryland. It is said that the company has received stock subscriptions amounting to $500,000 and $163,000 from the State of Maryland. A mortgage for $2,200,000 was executed and some bonds have been pledged as collateral, but none sold.

Philadelphia, Wilmington & Baltimore.

The work of laying the second track between Aberdeen, Md., and Chase's, 14 miles, was completed last week, and there is now a double track over the whole road from Baltimore to Philadelphia. This last section has been completed in four months, and included the widening of the very long pile bridges over the Gunpowder and Bush rivers. The main tracks are all laid with steel.

Salisbury.

The new company has begun work on this partially completed line, and it is to be pushed forward rapidly. As soon as track enough can be laid a construction train will be put on. The road (formerly known as the Salisbury & Baltimore) will serve a coal-mining region, and will extend from the Connellsville road at Meyersdale, Penn., southward to Salisbury, about eight miles.

The Lachine Canal Enlargement.

Owing to the illness of the engineer, the preparation of the plans and specifications for this work has been delayed, and the time for the reception of proposals been extended to September 29. The plans and specifications will be ready for examination at the offices in Ottawa and Montreal, September 16.

Massachusetts Central.

A new line has been surveyed between East Brookfield and Hardwick, passing through Brookfield Center and near West Brookfield. From East Brookfield east the new line follows the Boston & Albany for about five miles.

New Jersey Midland.

The Receivers have filed with the Chancellor of New Jersey a full account of receipts and expenditures since their appointment. From March 8 to April 4, Mr. G. A. Hobart was sole Receiver; at the latter date Mr. James W. McCulloch was associated with him. A summary of the report is as follows:

Balance on hand March 8		$261 47
Receipts March 8–April 4		18,178 18
" April 5–30		31,171 25
" May		37,457 59
" June		49,865 03
" July		53,554 39
Total		$190,467 91
Disbursements March 8–April 4	$10,750 42	
" April 5–30	33,065 34	
" May	40,872 41	
" June	47,468 57	
" July	57,246 05	
		189,332 79
Balance, August 1		$1,135 12

The receipts and expenditures for the whole period of four months and 23 days may be analyzed as follows:

Passenger receipts		$32,835 76
Freight "		117,185 62
Express, mail, telegraph, etc.		5,672 17
Total road receipts ($1,810 per mile)		$155,693 35
Working expenses (81.24 per cent.)		126,488 47
Net earnings ($340 per mile)		$29,204 88
Lease of Middletown, Unionville & Water Gap road		27,380 00
Balance		$1,824 88
Balance on hand March 8		261 47
Loan account		34,513 09
Total		$36,599 44
Loan account	$23,489 52	
Equipment account	3,480 77	
Construction account	4,234 38	
Right of way	2,789 65	
Legal expenses	1,500 00	
		35,464 32
Balance		$1,135 12

In the working expenses are included terminal charges at Jersey City paid to Pennsylvania Railroad, trackage to Middletown and taxes paid. The balance on hand at the time of the Receivers' appointment was very much more than offset by the unpaid pay-rolls, supply bills and other liabilities assumed by order of the Chancellor. It must be remembered that when the Receivers took the road it was completely broken down, and that its business, especially the milk traffic, the most profitable of all the freight traffic, had suffered largely by the actual inability of the road, as then managed, to carry it. The monthly earnings rose from $15,158.18 in March to $45,854.39 in July, showing a very gratifying growth over and above the usual increase of the summer months.

St. Paul & Pacific.

The unfinished portions of the lines of this company are a section from Melrose, Minn., northwest to a point 12 miles south of the crossing of the Northern Pacific at Glyndon, about 120 miles; a section of 62 miles between the northern end of the track, which is now completed from Glyndon northward through the Red River Valley to Red Lake River, and the Manitoba line at St. Vincent; the Brainerd Branch from Sauk Rapids to Brainerd, 55 miles. The two last-named sections are graded, but would probably require considerable repairs to fit them for the iron. It is said that if the bondholders accept the recent agreement and furnish funds to complete the road, the section from Melrose to Glyndon will not be built at present, but a connection will be made with the St. Vincent Extension by building a line about 32 miles long from Breckenridge, the western terminus of the First Division, northward, to meet the end of the track south of Glyndon. This section could be built with little expense, and would cost much less than the 120 miles from Melrose to Glyndon, and moreover would be wholly in the fertile Red River Valley, and contribute traffic to the whole length of the Main Line, of which it would form an extension. The line from Glyndon to St. Paul, by way of Breckenridge,

would be not more than 20 miles longer than that by Melrose.

Dr. de Klerck writes that on the 16th of August the Amsterdam bondholders' committee announced that an arrangement had been signed by J. S. Kennedy & Co., of New York, and J. Carp, Secretary of the Committee on one side, and the representatives of the St. Paul & Pacific Railroad Company on the other, which was to be submitted for approval at a meeting of bondholders in Amsterdam as soon as received there. It was then announced that negotiations for the St. Vincent and Brainerd extensions were not then concluded. The news had no effect on the prices of the securities on the Amsterdam Exchange.

American Railroad Bonds in Holland.

The United States Consul at Rotterdam in an official report says: "Concerning the transactions in United States railroad shares which, before the catastrophe in the United States, had been so important an element in the Dutch money market, I have but to repeat the statement of my preceding annual report. Far from showing any sign of returning confidence in United States railroad shares, the Dutch public rather manifests increasing aversion. The sale of United States railroad securities, even at the lowest rates, is limited to the smallest minimum. The laws recently enacted in Wisconsin concerning railroads have just affected those securities, in which the Dutch capitalists had invested enormous sums, namely, the Chicago & Northwestern, and the Milwaukee & St. Paul railroads. As yet the holders of these bonds still believe that the hopes created and entertained by the directors of these railroads will be realized, and that those laws will be annulled by the Supreme Court. Should this not be the case, a new depreciation of these securities, as well as of all other American railroad bonds, may be expected. For years to come, no investment of Dutch capital in United States railroad enterprises will be made. Financiers who, in this country, have been dealing in United States railroad securities, agree in declaring that a revival of confidence in American railroad enterprises can only be expected when a radical change of the present legislation on railroad companies takes place in the different States. As the best means of restoring confidence, they indicate a strict control of the creation and payment of the capital of companies; the obligatory, regular (at least monthly) publication of the receipts and expenditures of the railroads; the limitation of the arbitrary power of the presidents of the companies; and a greater influence on the part of holders of really paid bonds."

St. Louis & Southeastern.

The following proposition for a settlement with the bondholders has been submitted to Mr. Osterberg:

1. The establishment of a Committee of Inspection with authority to examine and audit the accounts, and to determine how much money shall be appropriated for improvements, or for retiring old or newly-contracted debts of the company so far as necessary for the protection of the property and its harmonious management. In other words, to regulate all payments with the exception of the strictly legal demands, and to direct what amount shall be devoted to the payment of the coupons.

2. In order to make this possible with safety, the company contracts that the Receiver shall remain in possession of the road hereafter as heretofore, and subject to the Inspecting Committee, until the regular payments are resumed.

3. Meanwhile monthly reports of earnings and expenses and of all payments of coupons shall be published.

4. Those first-mortgage coupons which were due in 1873, and remain still unpaid, shall be paid first. As soon as this is done the amount remaining disposable shall be divided *pro rata* among the other coupons, as may be satisfactory to the bondholders, until the expiration of the period of five years from May 1, 1875.

5. With regard to the liquidation of those first-mortgage consolidated bonds and all demands which are not paid out of receipts, as indicated above, income bonds shall be given to these creditors, secured by a second mortgage on the whole property of the company, with the exception of those parts of the line which are not in operation; the interest on these bonds, however, is to be paid only from the excess of net earnings over what is required to pay 7 per cent. on the first-mortgage bonds when there shall be such excess. These income bonds are to be exchanged at par for the first consolidated mortgage bonds, and be increased only by the funding of the first-mortgage coupons of the Kentucky Division.

In order to effect the acceptance of the arrangement by the creditors of later date, the first-mortgage bondholders are requested to consent to the funding of one-half of the amount of the coupons maturing between May 1, 1873, and May 1, 1880, on condition that the company pay the other half in cash. Should the company not pay half the amount of the coupons, then the whole shall become due and payable, next after the regular coupon interest.

6. The demand of the Wiggins Ferry Company for $43,600 for station grounds in East St. Louis, which is due Dec. 4, 1875, shall be extended a few years.

The net receipts of the St. Louis Division for the eight months ending with December next are estimated at $150,000; for the two following years, $600,000; for the whole period from May 1, 1875 to Dec. 31, 1877, at $750,000. The floating debt maturing meanwhile amounts to $357,128. Thus there would remain for the payment of coupons $392,872. The company thinks it probable that the coupons of the first-mortgage bonds due in 1873 can be paid by May 1, 1876.

The *German-American Economist* thinks that this scheme is entirely unacceptable to the bondholders.

West Wisconsin.

Dr. de Klerck writes from Amsterdam that the opinion prevails there that the Chicago & Northwestern has obtained control of this company and refrains from announcing it until the plan for an arrangement with the West Wisconsin bondholders has been carried through. Also that the English bondholders, believing that the bonds are being bought for the Chicago & Northwestern, decline to approve the proposed arrangement, and on the 23d of August were to hold a meeting in London, when it was expected that they would ask more favorable terms than those proposed in the arrangement, or resolve to proceed to foreclose their mortgage, which holders of bonds to the amount of £25,000 are authorized to do by the terms of the mortgage. The Amsterdam price of these bonds was 37½, which is considered too low.

The New English Erie Committee.

On Thursday, August 12, there was a meeting of Erie bond and shareholders in Liverpool, which was addressed by Mr. John Morris, of the law firm of Ashurst, Morris & Co., of London, a member of the committee of which Sir Edward Watkin is Chairman. Mr. Morris was on his way to America, sailing the same afternoon, and his speech may be of some significance with regard to the purposes of the committee and its support. We make some extracts:

"I suppose you will judge from my attire that I have come here not exactly on a business visit. I really have been caught on my passage to the steamer to-day to say a few words to you before I leave. I may begin by saying that the two committees who are now acting together, although originally appointed separately by the bondholders and shareholders, and still retaining their separate existence as independent committees, have determined between themselves to act together, believing that the best thing to be done for English interests generally is to have union among ourselves, so that we shall not present the spectacle of a mass of atoms, which will not be respected to anything like the extent which a combination of all interests will, and which will, I trust, help and encourage those gentlemen who have been deputed to go over to America and see what can be done with this important undertaking. Gentlemen, I do not suppose that to a body of Englishmen one need say very much in favor of the first step of the action of the two committees, that they should act together without reference to this interest or that interest. [Hear, hear.] I need not say that in coming to the resolution it has not been without opposition and cries of discontent from various quarters. One person wanted the extreme of rights in one direction and another in another direction, but all that has been abandoned; because I know, as a practical man with a great deal of experience of the working of the American railways, that while hostile foreclosures and shutting out of rights is a possibility it is surrounded with so many difficulties that it is almost practically impossible. It is a common feeling to Englishmen not to have any repudiation of anything which has been dealt with openly in the market, and therefore, when the parties interested in this country first heard of the suggestion that this was an attempt to repudiate the second-mortgage bonds, there was a cry of alarm and indignation throughout the country. I think, however, there is but one feeling on the subject, and that is that bonds which have been sold in the open market must be upheld. I refer to this because there is a feeling abroad that there is a covert intention to do something with the bonds. Within the last few weeks we have had the presence in this country of a gentleman deputed by the Receiver to come over here on business connected with the company. He is a gentleman of known standing in New York, and a solicitor of some eminence there, and he has assured me that whatever might have appeared in the papers, and whatever legal proceedings may have been taken over there as to the repudiation of those mortgage bonds, the parties in charge and people responsible to you had no such intention and no such desire. [Hear, hear.] Then, in regard to the shareholders, we have heard that some of the bondholders have pressed upon us the question why we should not get rid of these shareholders. The shareholders, they say, have got them into all these difficulties, and have not appointed good directors. No doubt there is an appearance of sense in it, but it is practically impossible, and therefore I think it is a wise policy as regards the bondholders that the shareholders should be respected in the position they occupy, not using them as a means of pulling down the bonds for their rights. I think, also, that no shareholder would stand up to-day and say he would take one iota of the rights of the bondholders; and so far as any suggestion of a repudiation of the bonds has been ventured to be raised, I say again that, while I believe the shareholders want to preserve to themselves the residue of property remaining after the interest on bonds has been paid, they are perfectly content with their position, and are willing to take any chance of what the future may produce in the way of securing the surplus to which they are entitled. You may take it from me that these committees have no desire to attempt, by arbitrary action or otherwise, to interfere with the position, legal rights and priorities in all classes interested. We are not going in for any policy of revolution, confiscation, or anything of that kind, but our object is to see whether by personal intercourse with the parties in charge of the railway—the Receiver, the directors and the officers of the company—we can find some better way out of the difficulties than dragging the company through the courts of law in America for the purpose of foreclosure or otherwise; and our first step will be to see whether by mutual concession—not giving up anything of our rights, but possibly postponing them for a time, we cannot enable this company to get on its legs again, without the aid of courts of law on the one side, or of the Legislature on the other, both of which would take the matter out of the hands of those interested in the concern. Now that you are roused up to the importance of it, I believe you will not consent again to dissolve into the individual atoms in which you were before, until you have put the thing straight and seen that for the future some precaution is taken against the recurrence of such things as have happened in the past. [Applause.] As to what ought to be done in America, it would be mere speculation for me to attempt to speak upon such a subject. I have ventured to propound my personal views to the committee, and the committee have entirely gone with me in what I have ventured to suggest, but I think it would be out of place to attempt to discuss at a meeting like this what must at present be a hypothetical scheme. It will be quite time enough for us to talk to you about a plan of reconstruction after we have had weeks or months of anxious inquiry, labor and investigation on the other side of the water. We will then come before you with a scheme which we can discuss. No scheme will be crammed down your throats; and whatever scheme we put before you will be subject to your adoption, but will be such a scheme as we will be prepared to bring forward in all its details. We shall also be prepared to defend those, and show you the reasons and policy which have actuated us in framing them. [Applause.] * * * * * * *

Our main object in asking you to meet us was to endeavor to evoke from you some resolution of unanimity, so that I could go to America and say, that whether it be London, Liverpool, Glasgow, or any great center of population, there is but one feeling of unanimity—that we will sink any little differences of opinion that we have—bondholders not pressing for their extreme rights, and shareholders not raising any question about the bonds, but all acting together in the emergency. * * * Our object is to go into this matter seriously, and I trust that we in two or three months shall be able to come before you with something in a definite form, and what that will be must depend a good deal upon what we find in America. I think I have told you all I need say upon the policy which influences the committee, but there is another subject I wish to refer to, and it is this: We want not only resolutions at meetings, but we want individual support. We want it for two reasons—one is that you cannot conduct the campaign without the sinews of war. We don't want to be dependent upon the company, but to go there in a friendly spirit and be prepared to talk to them on an independent basis. We do not want to be dependent upon any one, but to go as your representatives, and what we desire is a small *pro rata* contribution on the bonds and shares. I do not think I need go into that question very fully, because every gentleman will see in the report a statement of what is expected and what is wanted. We have framed the report on this basis. Some gentlemen say it is not convenient and they are not willing to throw money after this thing, but still are willing to throw one-half per cent. out of the first coupon due on their bonds. Then those gentlemen who like to pay sixpence per share can do so, and those who like to pay a quarter per cent. cash on their bonds can do so if they choose, while for those gentlemen who do not like to pay at all, but would like to tax their first coupons, we have provided a plan whereby any gentleman without paying a sixpence can aid us in the work by promising to pay something, not exceeding a half per cent., out of the first coupons, for which we could easily get bankers to advance us ready money to go on with in the meantime. * * *"

A resolution was passed pledging the meeting to aid the committee to the utmost of its power.

On the 10th, a meeting of the Glasgow Stock Exchange was held for a similar purpose, and passed a similar resolution.

LOCOMOTIVE RETURNS, MAY, 1875.

Master Mechanics of all American railroads are invited to send us their monthly reports for this table.

Name of Road.	Number of miles operated	Number of Locomotives in service	Mileage. Total	Mileage. Average per Engine	No. Miles run to Ton of Coal.	No. Miles run to Cord of Wood.	No. Miles run to Pint of Oil.	Average No. of freight cars hauled	Cost per Mile in Cents for Repairs	Fuel	Stores	Miscellaneous	Engine'rs, firemen and wipers	Total	Av'ge cost of Coal, per ton or bushel	Av'ge cost of Wood, per cord
Allegheny Valley	259	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Atlantic & Great West'n (First & Second Div.)	228	8	209,693	2,621	46.54	....	18.85	....	4.67	5.35	0.56	0.71	6.20	17.58	$2.31	$3.29
" " (Third & Fourth Div.	197	48	100,477	2,093	46.54	....	22.15	....	5.57	5.35	0.38	0 89	6.06	18.24	2.31	3.29
" " (Mahoning Division)..	121	60	91 414	1,524	46.54	....	18.90	....	3.76	5.35	0.45	0.77	5.99	16.32	2.31	3.29
Camden & Atlantic	67	12	19,462	1,622	64.39	....	22.50	....	6.68	9.69	0 87	....	5.65	22 89	5.82	....
Central Pacific (Western Division)	173.4	41	144,747	3,043	42,00	.....	18.56	.....	10.37	19.04	0.78	0.61	7.83	38.63	8.0	5.30
" " (Sacramento Division	119.5	34	113,076	2,976	.....	26.93	14.91	.....	6.87	18.32	0.26	0.98	8.79	35.91	.....	5.30
" " (Truckee Division)	204.5	27	91,699	3,396	33.15	27.05	15.54	.....	4.73	22.09	0.82	0.6	8.48	36.75	8.00	5.30
" " (Humboldt Division)	236.6	23	99, 50	3,885	37.11	.....	16.40	.....	4.11	21.55	0.76	0.40	6.83	33 65	8 00	5.30
" " (Salt Lake Division)	182.8	39	110,680	3,699	34 72	.....	16.72	.....	5 80	23.04	0.74	0.37	6 83	36 73	8.00	5 30
" " (Oregon Division)	151.42	6	19,367	3.228	.....	40.26	24.55	.....	4 00	13.16	0.62	0.86	8.01	26.65	.....	5.30
" " (Visalia Division)	231.8	16	38,685	2 418	48.29	50.00	15.54	.....	4.41	16.68	0.89	0.0	7.87	30.05	8.00	5.30
Cleve., Col., Cin. & Ind. (Columbus Div.)	138	57	151,000	2.649	45.83	91.66	39 63	.....	2.19	5 09	0.52	1,24	5.38	14.42	2.12	3 50
" " " (Indianapolis Div.)	207	63	170,524	2,707	47.78	56.63	15.45	.....	3.86	4.26	0.55	1.67	4.91	15.29	1.75	3.50
" " " (Cincinnati Div.)	130	28	74,485	2 660	41.36	.....	26.85	.....	2.22	4.72	0 49	1.35	5.22	14.00	1.75	3.50
Cleveland & Pittsburgh*	199	78	155,033	1,988	58.18	.....	19.27	15.70	4.26	3.02	0.71	2.66	7.00	17.65	1.50	1.58
Del., Lacka. & West. (Bloomsburg Div.)	80	26	51,750	2,070	.....	.....	27.12	.....	5.25	.....	0.72	.....	6.81	12.78	.....	.....
Flint & Pere Marquette	284	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Hannibal & St. Joseph	294	59	123 979	2,101	43,60	.....	19.60	.....	6.90	6.10	0.5	.....	7.00	20.50	2.50	3.60
Illinois Central (Chicago Div.)†	252.5	64	150,032	2,344	42.71	.....	5.9	17.39	6.88	4.55	0 35	.....	6.87	18.67	1.80	4.25
" " (South Div.)†	240.75	31	73,633	2,375	44.06	.....	15.08	13.94	10.27	4.42	0.38	.....	6.77	21.84	1.80	4.25
" " (North Div.)†	225	44	107,202	2.436	35.80	.....	15.80	16.39	9.31	5.53	0.35	.....	6.75	21 94	1.80	4.25
" " (Iowa Div.)†	401	42	114.929	2,736	33.79	.....	19.05	13.38	5.03	7.07	0.30	.....	6 48	18.88	2.30	4.75
Jeffersonville, Madison & Indianapolis	225	43	89.310	2,077	50.12	29.53	18.11	.....	4.28	6.23	0.44	2.27	7.01	20.23	2 85	3 00
Kansas Pacific, Main Line‡	673	86	148.45	1,725	33.80	.....	13.13	.....	5.23	9.73	0.49	.....	7.18	22.63	3.25	2 05
" including all branches‡	895	94	169,433	1,802	34.97	.....	13.40	.....	4.65	9.57	0.47	.....	7.20	21.99	3.30	3.26
Kansas City, St. Jo. & Council Bluffs‖	334	24	66,558	2,773	47.30	.....	25.20	20.90	6.20	6.90	0.60	.....	7.50	21.20	3.00	3.5
Lake Shore & Mich. South. (Buffalo Div.)¶	.....	93	15 ,020	1.613	47.31	42.81	15.45	.....	6 03	7.40	.....	.....	6.73	20.16	3.50	3.50
" " (Erie Div.)¶	.....	114	199,090	1,746	46.14	39.85	21.18	.....	7.21	7.79	.....	.....	6.79	21.79	3.50	4 00
" " (Toledo Div.)¶	.....	79	144,808	1,833	38.19	49.71	13 00	.....	5.12	10.02	.....	.....	6.54	21.68	4.00	4.00
" " (Mich.South.Div.)¶	....	209	433.771	2,075	44.92	60.06	19.47	.....	4 27	8.38	.....	.....	7.09	19.74	4.50	3.50
Leavenworth, Lawrence & Galveston	203.7	18	18,962	1,053	64.80	.....	27.60	.....	7.36	6.06	0.37	.....	5.96	19.75	3.63	3.50
Marquette, Houghton & Ontonagon	88	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Northern Central (Elmira & Canandaigua Div.)	.....	43	79,121	1,840	30.98	.....	20.00	.....	6.72	7.73	0.74	.....	6.35	21 54	0.08	2.88
Pennsylvania (New York Division)	119.9	112	269,242	2.404	36.08	.....	11.09	.....	10.20	14.30	1.30	.....	.....	25.80	0.18	6.96
" (Amboy Division)	154.2	45	78.197	1,738	56.24	.....	17.42	.....	9 00	9.10	0 80	.....	.....	18.90	0.18	6 98
" (Belvidere Division)	102.5	29	50,197	1,759	53.61	.....	14.01	.....	6.2	9.50	1.20	.....	.....	16.90	0.18	6.96
" (West Jersey Railroad)	158	17	30,080	1,769	45.90	37.17	21.28	.....	3.50	9.60	0.70	.....	.....	13.80	0 17	3.52
" (Philadelphia Division)	204.3	167	435,269	2.606	34.22	.....	14.71	.....	4.30	4.40	0 90	.....	.....	9.60	0 05	3.52
" (Middle Division)	131.6	130	94,635	2,251	34.73	.....	22.52	.....	4.10	4.30	0.60	.....	.....	9.00	0 05	3.52
" (Pittsburgh Division, East End)	.....	72	127,074	1.765	23.19	.....	12.05	.....	9 70	6.3	1 20	.....	.....	17.20	0.05	3.52
" (Pittsburgh Division, West End)	.....	112	240,180	2.144	34.93	.....	13.77	.....	10.50	4.20	0 90	.....	.....	15.60	0.05	3.52
" (Tyrone Division)	106.8	32	42.856	1,339	27.76	.....	26.74	.....	49.0	54.10	5.9	.....	.....	109.00	0.05	3.52
" (West Pennsylvania Division)	103.6	24	47,145	1,964	43.81	.....	36.23	.....	4 30	3.60	0.40	.....	.....	8.30	0.05	3.52
" (Lewistown Division)	12.5	3	3,745	1 248	58.29	.....	21.74	.....	0.50	2.70	0.50	.....	.....	3.70	0.05	3.63
" (Bedford Division)	56.5	6	13,161	2,194	51.44	.....	27.93	.....	0.80	3.10	0 40	.....	.....	4.30	0.0	3.53
Philadelphia, Wilmington & Baltimore	.....	73	145.768	1,997	66.36	.....	10.46	.....	6.00	8.30	1.20	.....	7.10	22.60	4.75	5.00
Pitts., Fort Wayne & Chicago (Eastern Div.)*	468.9	182	428,589	2 355	41.00	.....	16 79	14.70	3.77	3.68	0.94	1.23	6.47	16.9	1.59	1.59
" " (Western Div.)*	280	107	286,026	2,6 3	45.70	.....	16.60	23 20	3.90	4 30	0.50	2.50	6.20	17.40	1 96	1.96
Pitts., Cin. & St. Louis (Little Miami Div.)	197	39	98,657	2,530	47.78	.....	13.61	.....	4.83	3.96	0.96	2.03	6.87	18.65	1.75	2.75
" " (Pittsb. & Col. Div.)	224	95	243,703	2,565	31.70	.....	15.40	.....	5.84	4.72	0.85	2.41	6.72	20.54	1.40	3.60
South Carolina	242	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Stockton & Copperopolis	49	3	3,771	1.257	.....	63.92	17.62	.....	5.96	8.60	0.90	1.62	10.47	27.55	.....	5 50
St. Louis, I. M. & South. (Arkansas Div.)	305	25	63,355	2,534	.....	41.70	20.10	.....	2.94	6.03	0.50	.....	7.20	16.67	.....	2,51
Terre Haute & Indianapolis (Indianap. Div.)	112.63	....	61,390	.....	31.60	.....	19.20	.....	6.69	6.09	0.90	.....	8.34	22 02	1.93	.....
" " (Vandalia Div.)	158.3	....	81.017	.....	37.30	.....	23.20	.....	6.55	3 85	0.92	.....	8.82	20.14	1.43	.....

* Five empty cars rated as three loaded ones.
‡ Switching and work train engines allowed 60 miles per day.
¶ Switching engines allowed 6 miles per hour.
† Two empty cars rated as one loaded one.
‖ Three empty cars rated as two loaded ones.